SIMON MINE

MINERAL COUNTY, NEVADA

AUGUST 1980

LEONARD J MAKI & ASSOCIATES

MINING CONSULTANTS

8347 SOUTH MESA DRIVE SANDY, UTAH 84070

(801) 561-8902

INTRODUCTION

The Simon Mine, located in west central Nevada, has an operating history dating back to 1916. Since then, this mine has produced substantial tonnages of silver, lead, and zinc ore. Operation of the mine has been intermittent over the years with the last production in the late 1960's. Metal prices seem to have been the primary controlling factor in the operation and non-operation of the Simon Mine.

The geology of the Simon Mine area is a complex of faults and intrusives in a Triassic limestone unit. Replacement ore bodies have formed along fault breccias and created irregular masses of high grade ore. All of the ore bodies in the Simon Mine are related to the fault systems and the faults are probably the key to finding new ore bodies.

The Simon Mine, at present, does not maintain an official ore reserve, but, several blocks of ore are known to exist in the mine. The potential for developing an economic mining operation seems very possible, but, further exploration will be required. With the present prices for metals, the economics for the Simon Mine are probably better than they have ever been.

This is a brief compilation and evaluation of the Simon Mine. The basis for the data in this report is derived from previous authors and three weeks of on site investigation by this author.

SUMMARY

The Simon Mine, since its beginning in 1916, has produced nearly 100,000 tons of silver, lead, and zinc ore. This ore was deposited as limestone replacements along several major fault structures. To date, the Simon Mine has been developed to a depth of about 1,000 feet, but, the bulk of the production has been from the upper levels of the mine.

The potential of finding additional ore deposits in the Simon Mine area seems very good. Past operations have systematically discovered ore zones as the mine was developed deeper. The primary exploration targets have been expansions of the original discovery, but, little effort has been expended to study the ore potential of the entire Simon Mine area or at depth. Present geologic information indicates that there is no reason to believe that the ore potential in the Simon Mine area has been exhausted.

RECOMMENDATIONS

A review and evaluation of the Simon Mine and the surrounding area indicates the need for the following recommendations:

1. A complete geochemical sampling program should be conducted over the entire Simon Mine area.
2. A detailed mapping and sampling program should be conducted both on the surface and underground.
3. The drill cores, stored at the mine site, should be logged in detail.
4. A complete drilling program should be conducted based on an evaluation of existing data and data derived from items 1, 2, and 3.

These recommendations are listed in their approximate order of importance with items 1, 2, and 3 possibly occurring simultaneously.

LOCATION

The Simon Mine is located in west-central Nevada about 23 miles northeast of the town of Mina, which is the terminus of a spur line of the Southern Pacific Railroad and is also on U.S. Highway 95 (Fig. 1). This mine is situated on the eastern edge of Mineral County in the Cedar Mountains at an elevation of about 6,800 feet.

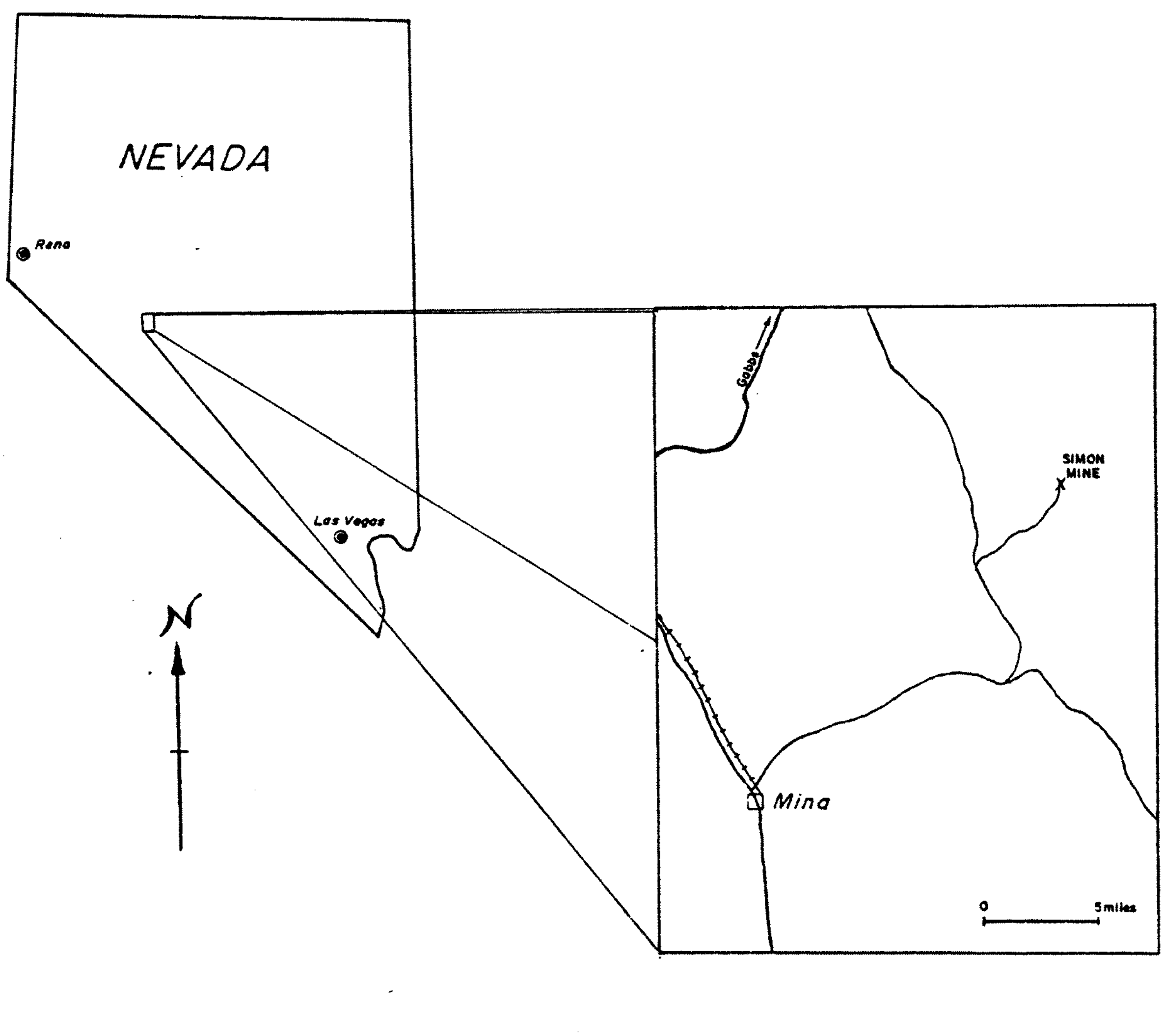


Figure 1. Location Map.

HISTORY

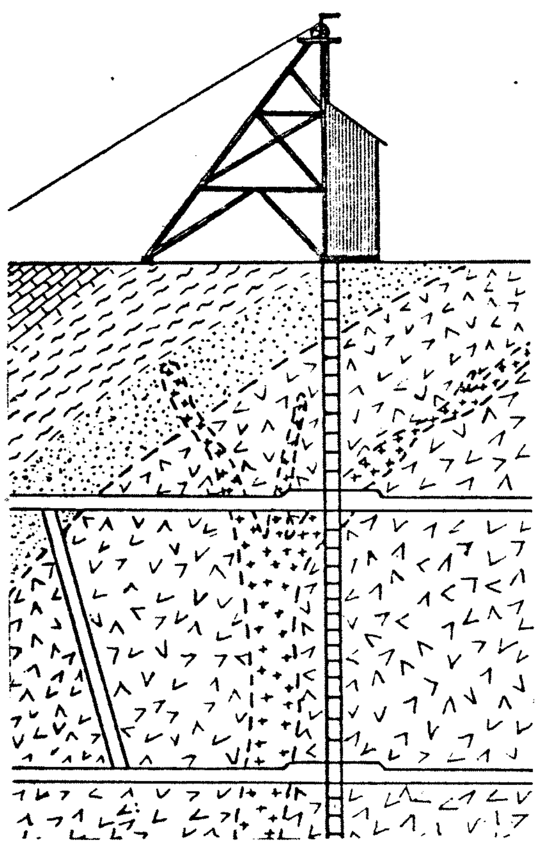
The Simon deposit was originally discovered about 1879, but little or no work was done until 1916, when F. A. Simon organized the Simon Silver-Lead Mines Co.. By 1919 the deposit had been explored to about the 500 foot level through the No. 1 shaft (Plate 1). This exploration developed enough ore to justify the construction of a 100 ton per day mill in 1921, which was later enlarged to 250 tons per day. In 1922 the No. 3 shaft was sunk to about the 800 foot level. This shaft opened a larger mining area to the west of the No. 1 shaft. The mine and mill continued to operate until 1927, when operation was shut down due to poor metal prices.

The Simon Mine was again in operation in the 1930's, again in the 1940's and once more in the 1950's. Most of these operations were conducted in the No. 1 shaft area and mined the highest grade portions of the ore bodies, but operations in the 1930's involved exploration, and development to the west of No. 3 shaft. In each case operations ceased due to poor metal prices.

In 1963 Federal Resources Corporation began reopening the Simon Mine. Dewatering of the No. 3 shaft was started, but had to be discontinued due to poor shaft conditions. Late in 1964 the No. 4 shaft was started and was completed to 1,088 feet by mid 1965. A new 800 level and 1,000 level were driven from this shaft in a northwesterly direction to ore bodies discovered in the 1930's. Federal Resources Corporation continued operations until 1968 when their lease was terminated.

The Simon Mine, since that time, has not been in operation except for a small amount of ore shipped in 1970 by the owner.

During the entire operational history of the Simon Mine, a total in excess of 98,000 tons of ore were mined with an average grade of about 3½ ounces of silver per ton, 5 percent lead, and 5½ percent zinc.



GENERAL GEOLOGY

The geology of the Simon Mine area is composed chiefly of Triassic Age limestone units that have been intruded and overlain by younger rocks of igneous origin. Faulting in the area, has contributed greatly to the location of many of the intrusives and to the mineralization. Several major fault structures cut through the Simon Mine area and are interconnected by numerous local faults (Plate 2).

TRIASSIC

Luning Limestone

The oldest formation, in the Simon Mine area, is the Triassic aged Luning limestone. This formation is usually dark gray in color and massive, with a section thickness of over 6,000 feet. In the Simon Mine area, over 1,000 feet of Luning limestone is exposed and seems to be uniformly homogeneous, which makes structural interpretation very difficult due to the lack of recognizable horizons. On the surface, weathering reveals some of the bedding features of this formation, making it somewhat easier to decipher the structure.

Keratophyre

The Keratophyre, also known as the Simon Quartz Keratophyre, is used to describe a series of lavas and breccias that occur in the Simon Mine area. This unit is composed of numerous crystals of quartz and feldspar in a cryptocrystalline groundmass of devitrified glass and in field observation could be considered a rhyolite.

The exact structural relationship of the keratophyre with the adjacent rocks is very obscure. In general, the keratophyre is in fault contact with the surrounding rocks in nearly all locations. Bedding within the tuffs are difficult to distinguish and make it impossible to determine the strike and dip.

Through drilling, the keratophyre is known to be as much as 300 feet thick and in the mine, it is known to extend to at least the 200 foot level.

The age of the keratophyre is believed to probably be Triassic. This unit is thought to have been erupted about the same time time that the limestones in the area were being deposited.

LATE JURASSIC or EARLY CRETACEOUS

A number of granitic intrusives occur in the Cedar Mountains and the edge of one of these intrusions is located a few hundred yards southeast of the Simon Mine. This granitic intrusion is relatively large, extending to the south and east for some distance. The area of the intrusion is easily recognizable with a distinct difference in geomorphic features. A bold contrast in relief is evident between the intrusion, with a subdued rounded appearence, and the surrounding limestone, with a bold sharp appearence.

The intrusion near the Simon Mine is medium to coarse grained and by composition would be called a granodiorite. The contacts of this intrusve tend to be porphyritic and have formed in an irregular pattern of tongues and dikes. Aplite, lamprophyre, and diorite porphyry dikes occur in and around the edge of the intrusive. All of these dikes are related to the main granodiorite intrusive. Other dikes of monzonite porphyry commonly occur in the limestone and keratophyre near the Simon Mine. These dikes are probably of the same origin as the others but, have been altered by the introduction and oxidation of pyrite.

TERTIARY

<u>Mammoth Andesite</u>

The oldest Tertiary volcanic rock in the Simon Mine area is the Mammoth andesite. This rock is gray-green in color and is porphyritic with small phenocrysts of plagioclase. The

Mammoth andesite seems to be uniform in character and probably is composed of a single lava flow. In the Simon Mine area the Mammoth andesite has been faulted down against the limestone and keratophyre, thus, the exact thickness of this unit is unknown.

Other Units

Several other younger Tertiary volcanic units occur in the Simon Mine Area. The oldest of this group is described as a keratophyre, but is different from the previously described keratophyre. The primary difference is the age of this unit, in that, this unit overlies the Mammoth andesite which is younger than the previously descrived keratophyre. Otherwise, this unit looks very similar to the older kertophyre with a conspicuous chalk-white appearance and an aphanitic texture.

Overlaying the keratophyre is a unit described as a pyroxene andesite. This unit is not present in the immediate Simon Mine area but outcrops to the north and west. The pyroxene andesite is commonly altered but in a fresh specimen shows a purple cast.

A dacite tuff is the next youngest unit in this group. This unit is relatively thin and Iooks very much like a white porphyritic rhyolite.

The youngest Tertiary volcanic, in the Simon Mine area, is a quartz latite. This unit is probably the most abundant Tertiary volcanic in the area and forms some of the hill tops near the mine. In some places this unit is more than 200 feet thick. The quartz latite weathers to a distinct red-brown and is easily distinguished from the other units. In a fresh specimen, the quartz latite is a gray, porphyritic, biotite rich lava and would, generally, be called a rhyolite in the field.

STRUCTURE

The primary structural feature of the Simon Mine area is the faults systems. Although this area is part of the Cedar Mountain uplift, the significance of the uplift is overshadowed by several major fault features. The Cedar Mountain uplift has created an arching in the older sedimentary units. In the Simon Mine area, these units, generally, dip in a westerly direction from about 10 to 50 degrees, whereas, the same units to the east of the mine dip in an easterly direction.

The faults in the Simon Mine area are part of a system of faults. Three primary sets of faults occur in the area (Fig. 2). The oldest set can be called the Simon set and strikes N 60° W and dips steeply to the northeast. This set seems to have been active several times during the structural history. Faults of this set seem to carry much of the mineralization in the Simon Mine as well as dikes.

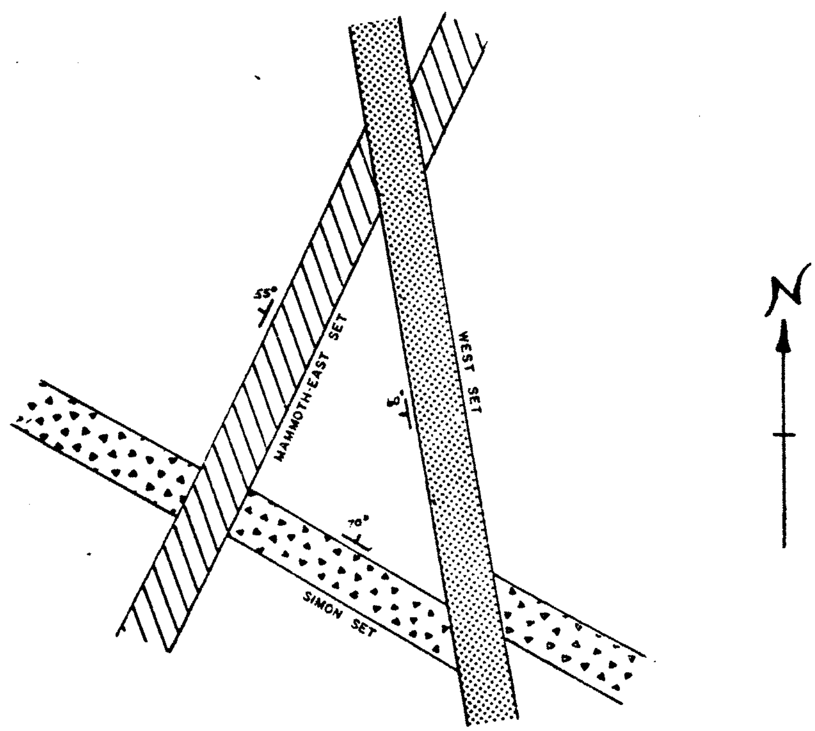


Figure 2. Schematic Representation of the Simon Mine Area Fault Sets.

The second fault set can be called the Mammoth-East set. These faults, generally, strike N. 25° E. and dip from 50° to 55° to the northwest. Faults of this set commonly carry some mineralization but, the mineralization usually occurs at intersections with the older Simon fault set. The Mammoth-East faults offset the older faults and show considerable displacement in some places.

The youngest fault set can be called the West set. These faults are probably the most recent in the area. The general strike of this set is N. 10° W. and the dip is about 60° to the west. The West set seems to be post ore in time and show little or no mineralization. Both of the other fault sets are cut and offset by the West fault set.

The Simon and East fault sets seem to be normal faults. The exact vertical displacement of these faults is very difficult to determine but several of the faults seem to show displacements in the hundreds of feet. Another feature of both fault sets is that they have large gouge and breccia zones, which would indicate substantial movement in the faults.

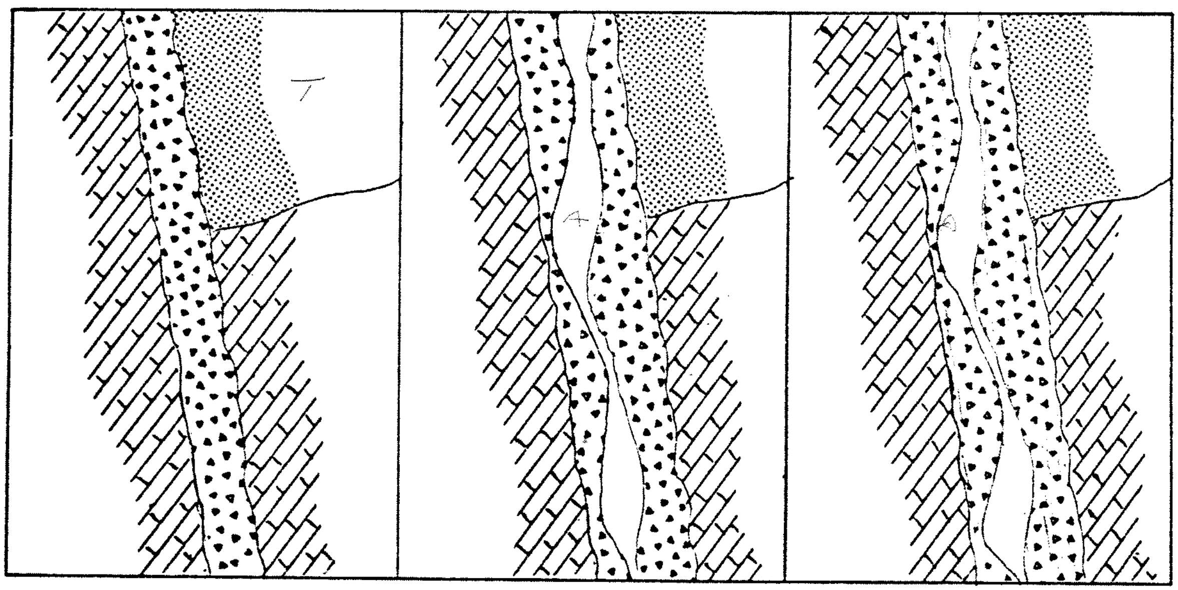
The West fault set is difficult to decipher as to movement. At first, it would seem the faults of this set are normal faults, similar to the other sets but, in studying this set further, it appears that the faults of the West set may be reverse faults or more possibly wrenching normal or reverse faults.

MINERALIZATION

The mineralization of the Simon Mine area consists, primarily, of replacement ore bodies of silver, lead, and zinc with some copper and gold. The most common ore minerals are galena, sphalerite, and chalcopyrite, in a gangue of quartz and silicified limestone or dike. The mineralization is most often found along fault structures, in areas of intense brecciation.

The brecciation seems to have been a requsite for ore deposition and the fault systems provided the piping system for the mineralizing fluids.

The original mineralization at the Simon Mine was found along a granitic dike (alaskite?), intruded in to a Simon set fault. Previous to the intrusion, this fault, apparently, had considerable movement and created a sizeable breccia zone (Fig. 3A). The granitic dike (alaskite?) was, then, intruded into the same breccia zone, which caused additional brecciation (Fig. 3B). At the same time, some of the previous fault breccia was assimilated into the dike. Finally, the entire dike and breccia zone were injected with mineralizing fluids (Fig. 3C). The mineralizing fluids silicified both the dike and breccia and deposited the ore as a replacement of limestone breccia and limestone breccia assimilated into the dike.



A. B. C.

Figure 3. Sequence of Ore Deposition.

A sequence of events similar to this has probably occurred in the entire Simon Mine area. Relationships of ore, breccia, and dike appear in numerous locations throughout the mine and are probably the key to finding ore (Plates 3, 4, & 5).

The mineralization, in the Simon Mine, tends to be somewhat gradational as to metal composition with depth. The amount of copper in the ore seems to be increasing deeper in the mine. This may indicate a hydrothermal zonation in the area and could be a possible deep exploration target.

ORE RESERVES

The Simon Mine, at present, does not maintain an offical ore reserve. In the past, ore reserves were estimated in several areas of the mine. The lowest levels of the mine had a number of estimated ore blocks, but, the records of the work done by Federal Resources Corporation are incomplete and the amount of ore remaining is unknown. Other blocks of reserves were estimated in areas just below the 353 level. These blocks were estimated to contain about 30,000 tons of ore. From existing records, these reserves seem to have been left unmined. As for any other reserves of the past, the records are so incomplete that no estimate can be made.

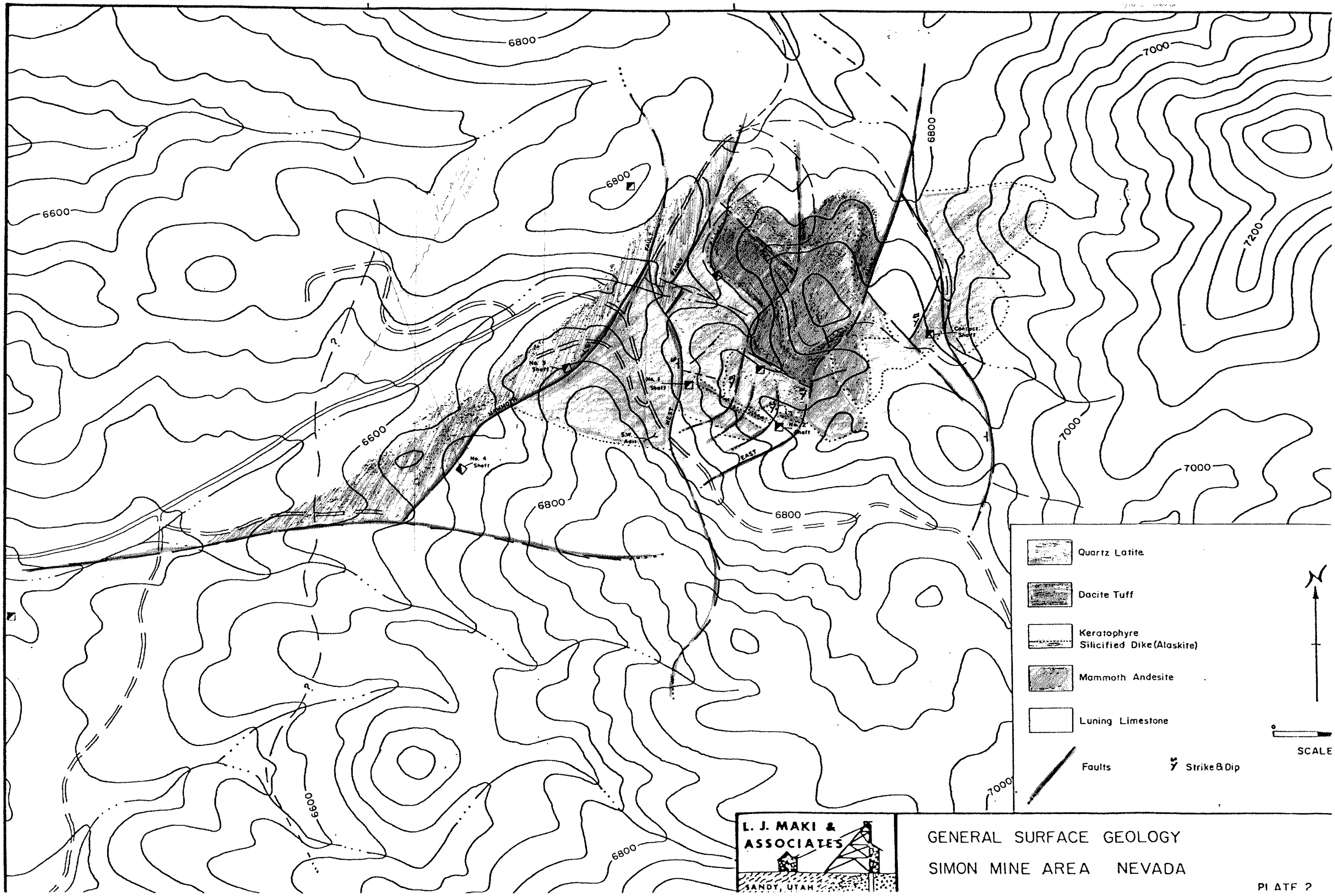
An area that has never been considered as a reserve, is the oxide zone above the 252 level. This area is essentially unmined and could contain from 20,000 to 50,000 tons of ore. The ore in this area would be relatively low grade, but, it would be very inexpensive to mine.

To establish a complete ore reserve, the Simon Mine would require a complete detailed evaluation.

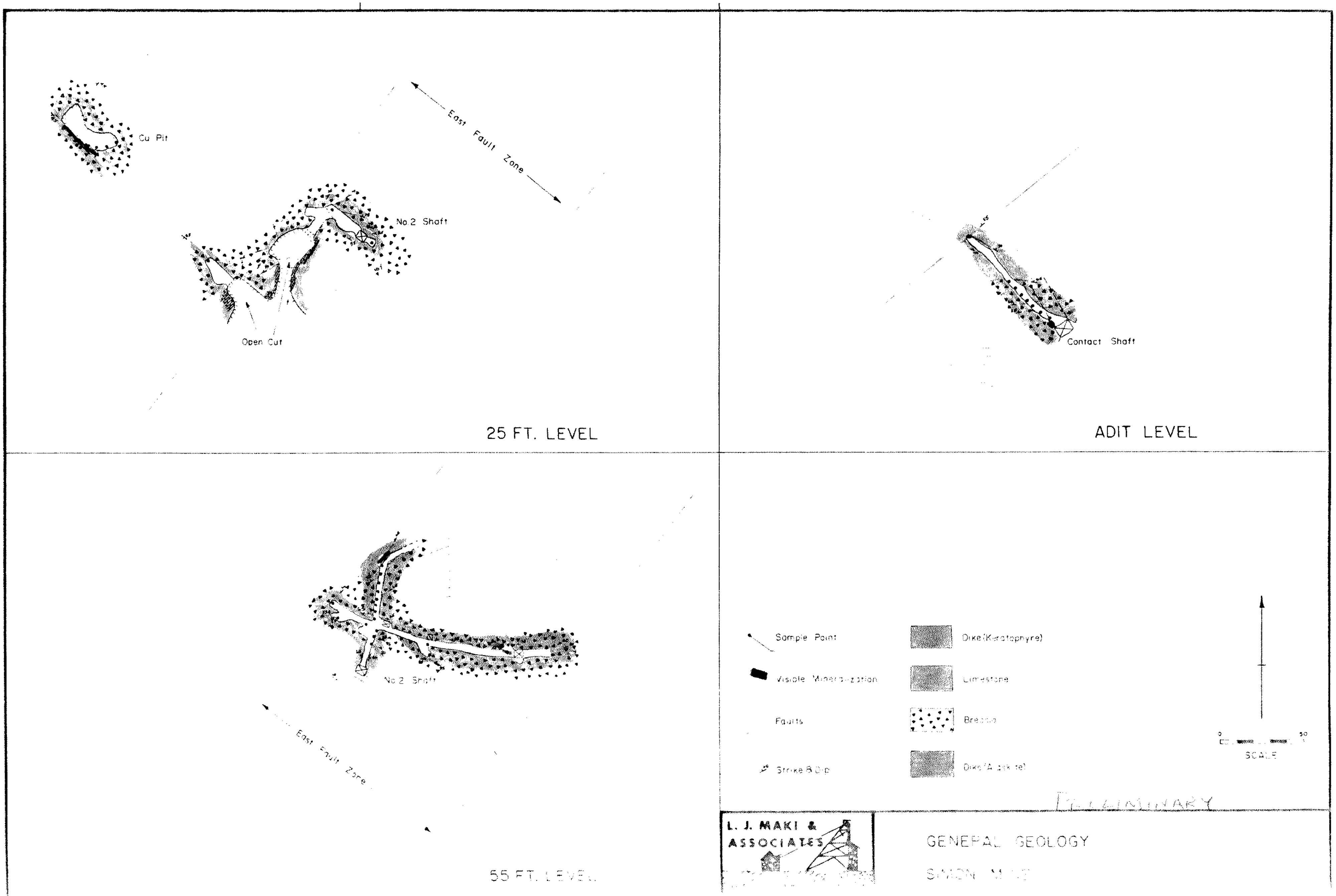
L. J. MAKI & ASSOCIATES
SANDY, UTAH

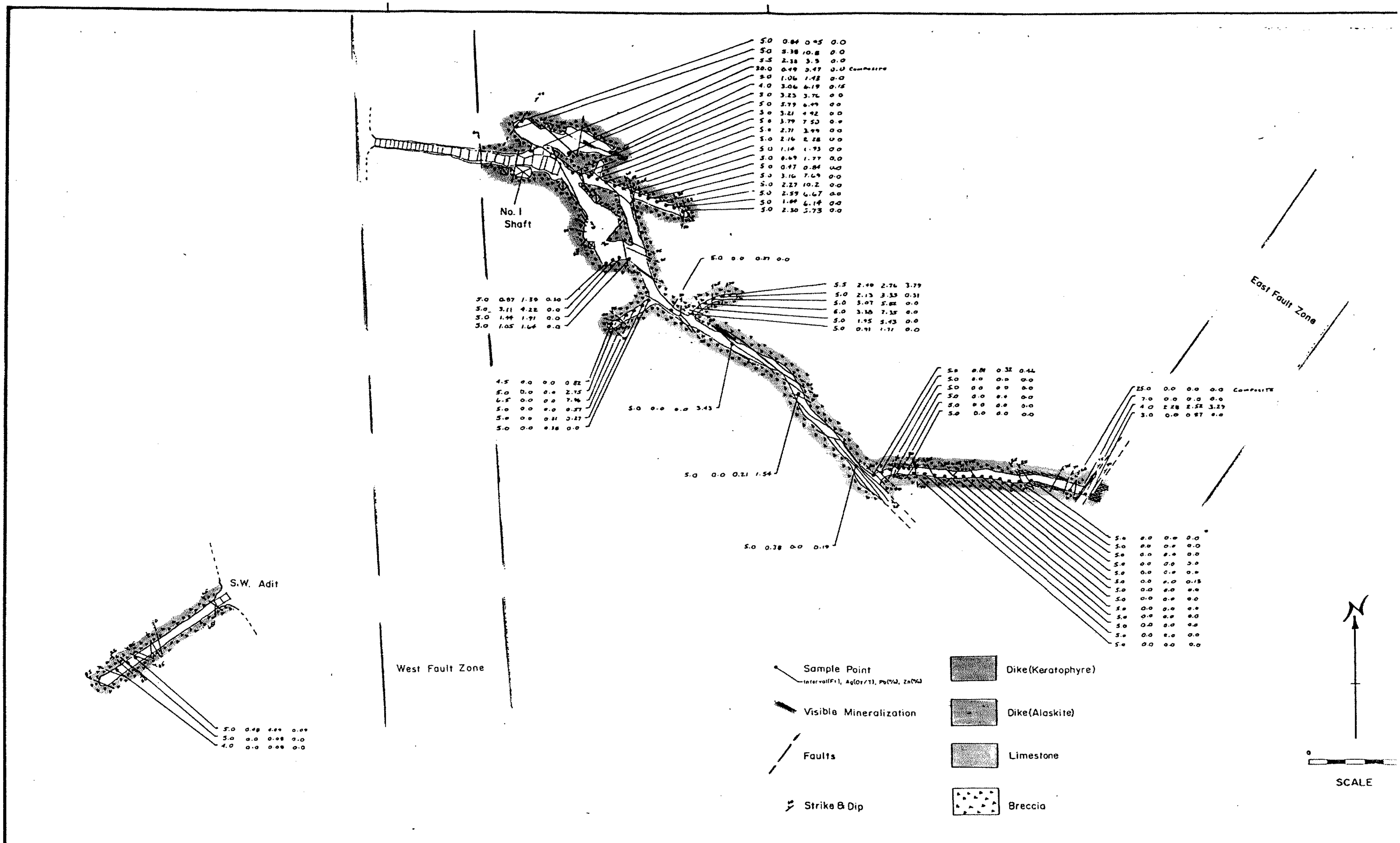
COMPOSITE OF UNDERGROUND WORKINGS
SIMON MINE

PLATE 1



6600
6800
7000
7200
No. 1 Shaft
No. 3 Shaft
No. 4 Shaft
Contact Shaft
S.W. Adit
Mammoth
West
East
Quartz Latite
Dacite Tuff
Keratophyre
Silicified Dike (Alaskite)
Mammoth Andesite
Luning Limestone
Faults
Strike & Dip
N
SCALE
L. J. MAKI & ASSOCIATES
SANDY, UTAH
GENERAL SURFACE GEOLOGY
SIMON MINE AREA NEVADA
PLATE 2


Cu Pit
East Fault Zone
No 2 Shaft
Open Cut
25 FT. LEVEL
Contact Shaft
ADIT LEVEL
No 2 Shaft
East Fault Zone
55 FT. LEVEL
Sample Point
Visible Mineralization
Faults
Strike & Dip
Dike (Keratophyre)
Limestone
Breccia
SCALE
0
50
PRELIMINARY
L. J. MAKI & ASSOCIATES
GENERAL GEOLOGY
SIMON



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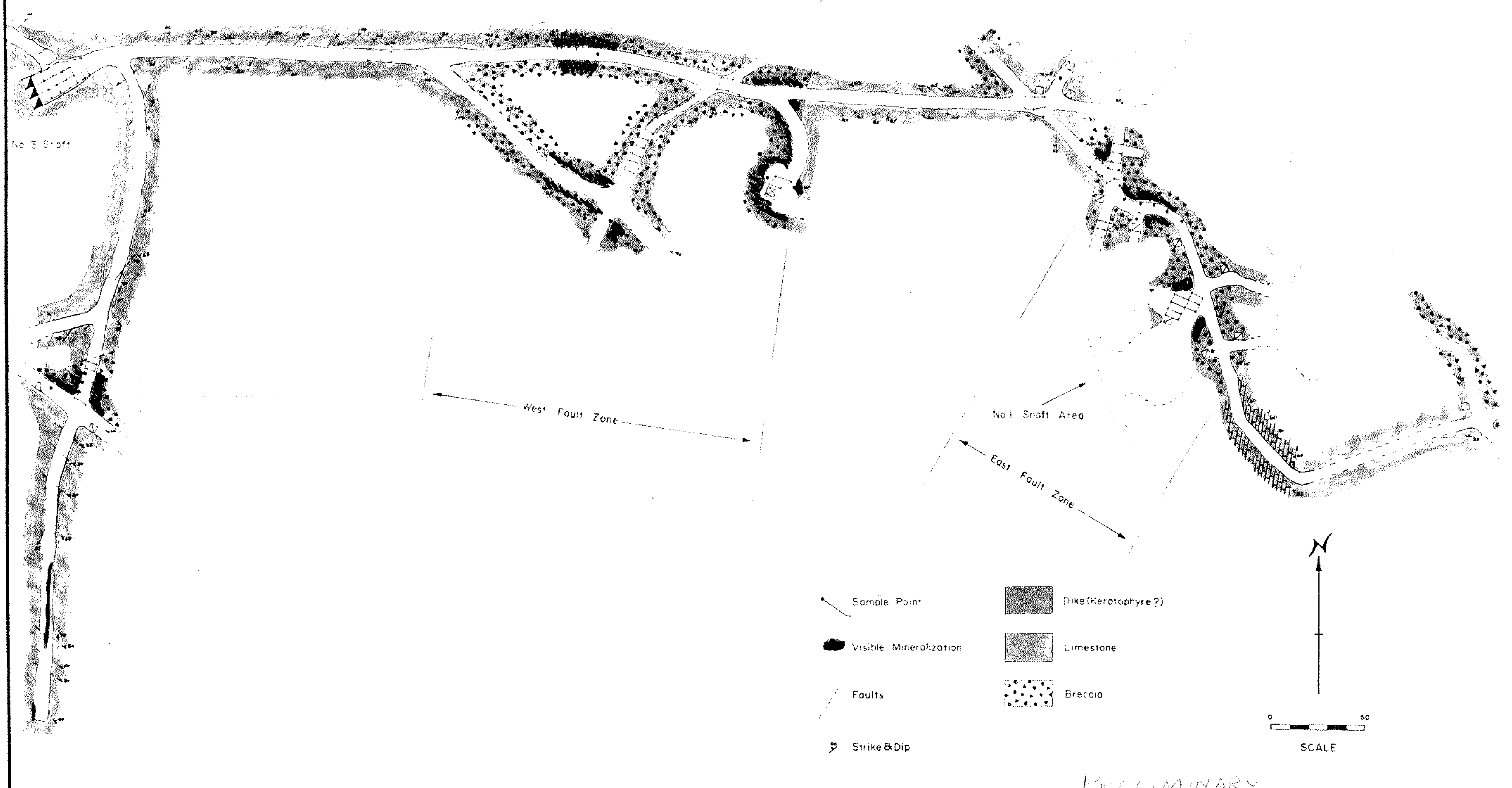
GENERAL GEOLOGY — ADIT LEVEL
SIMON MINE

PLATE 4



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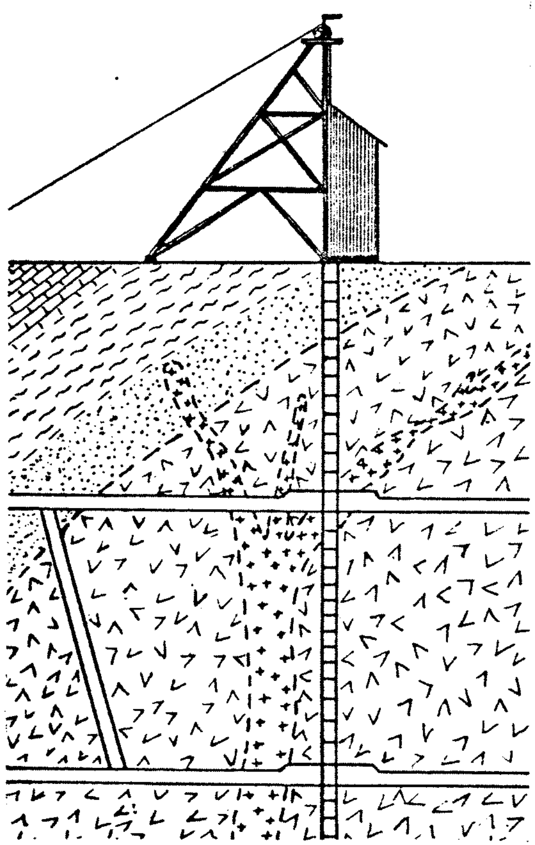
GENERAL GEOLOGY – 353 LEVEL

SIMON MINE

SAMPLING AND ASSAY DATA



DATE 5/17/80 **LJM & A** No. 1002

PROJECT Simon Mine

LOCATION Adit Level - West Stope - West Face

S T R

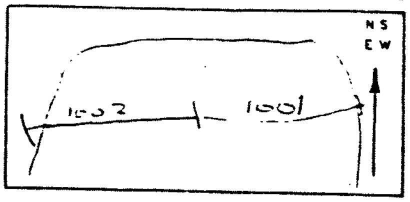
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

5ft Channel - contiguous with # 1001 to North

- same Rx - qtz bx

- more FeOx staining

- More MnOx

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER JR & LJM

DATE 5/17/80 **LJM & A** No. 1001

PROJECT Simon Mine

LOCATION Adit Level - West Stope - West Face

S T R

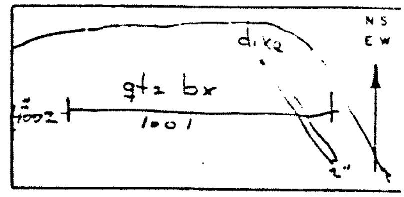
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

Rx = qtz bx + minor amount dike material

5Ft Channel Sample

+ Trace MnOx

+ Minor FeOx sulfides

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM & JWB

DATE 5-17-80 **LJM & A** No. 1004

PROJECT Simon Mine

LOCATION Adit Level - West Stope - Side Slash on S. Side

S T R

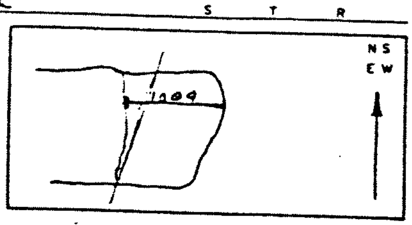
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

5Ft Channel Sample

Rx - Qtz Bx - Some FeOx Staining

- Minor Sulfides

ASSAYED FOR: (Au) (Ag) (Cu) Pb (Zn) OTHER

SAMPLER LJM & JWB

DATE 5/17/80 **LJM & A** No. 1003

PROJECT Simon - Mine

LOCATION Adit Level - West Stope - West Stope

10 ft N. of Main Shaft

S T R

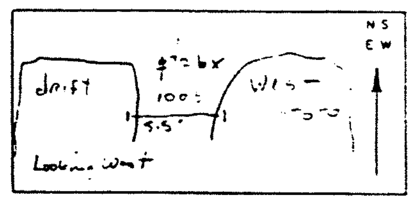
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

5.5 ft Channel - 2 Bags

Rx = qtz bx - chloritic -

FeOx & MnOx

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM

DATE ________ **LJM & A** No. 1006

PROJECT ________

LOCATION Near [illegible] West Stope

S T R

SAMPLE TYPE

ROCK

SOIL

SEDIMENT

OTHER ________

N S
E W

SAMPLE DESCRIPTION

Chip – [illegible] x 20 ft±

Rx = dike bx

\+ minor [illegible]

\+ [illegible] sulfides

ASSAYED FOR:

Au Ag Cu Pb Zn OTHER ________

SAMPLER LJM

DATE 5/17/80 **LJM & A** No. 1005

PROJECT Simon Mine

LOCATION West Stope – EAST FACE

S T R

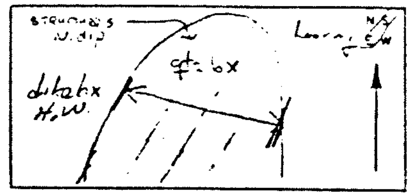
SAMPLE TYPE

ROCK

SOIL

SEDIMENT

OTHER ________



SAMPLE DESCRIPTION

4ft. CHANNEL

Rx = [illegible] – qtz bx

[illegible]

minor [illegible]

\+ small clots of PbS [illegible]

\+ small [illegible] sulfide

\+ small [illegible]

– MINOR [illegible] from dike bx on HW

ASSAYED FOR:

Au Ag Cu Pb Zn OTHER ________

SAMPLER LJM

DATE 5/18/80 **LJM & A** No. 1008

PROJECT Simon Mine

LOCATION Main drift

S T R

SAMPLE TYPE

ROCK

SOIL

SEDIMENT

OTHER ________

N S
E W

SAMPLE DESCRIPTION

5' channel

Rx = qtz bx. more [illegible] altered & Less siliceous than [illegible] 1007

bleached [illegible]

[illegible]

ASSAYED FOR:

Au Ag Cu Pb Zn OTHER ________

SAMPLER ________

DATE 5/18/80 **LJM & A** No. 1007

PROJECT Simon Mine

LOCATION Main drift – N. Rib – STARTING N. of Δ102

S T R

SAMPLE TYPE

ROCK

SOIL

SEDIMENT

OTHER ________

N S
E W

SAMPLE DESCRIPTION

5' CHANNEL

Rx – qtz bx – [illegible]

– [illegible] – minor [illegible]

ASSAYED FOR:

Au Ag Cu Pb Zn OTHER ________

SAMPLER [illegible]

DATE 5/18/80 **LJM & A** No. 1010

PROJECT Simon Mine

LOCATION Main drift

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER

SAMPLE DESCRIPTION

5 ft channel

~~... qtz bx~~

~~... zone~~

2.5 ft - gray ... RX

2.5 ft Bl... - soft qtz bx

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 5/18/80 **LJM & A** No. 1009

PROJECT Simon Mine

LOCATION Main Drift

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER

SAMPLE DESCRIPTION 5' channel

2 bags

Rx = qtz bx - soft ...

white gray ...

FeOx

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER JWB & LJM

DATE 5/18/80 **LJM & A** No. 1012

PROJECT Simon Mine

LOCATION ... - main drift

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER

SAMPLE DESCRIPTION

5' channel - ...

qtz bx - soft - high FeOx - ...

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 5/18/80 **LJM & A** No. 1011

PROJECT Simon Mine

LOCATION Main drift

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER

SAMPLE DESCRIPTION

5 ft channel - 2 bags

Rx = 3' - soft ... qtz bx

2' - high FeOx zone

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

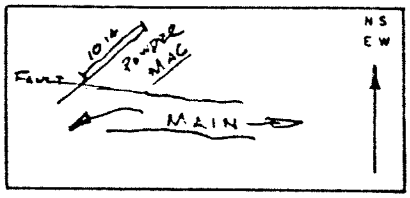
DATE 5-18-80 **LJM & A** No. 1014

PROJECT Simon Mine

LOCATION Adit Level - Insection of Main & Powder Mag Drifts

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER ______



SAMPLE DESCRIPTION 5' Channel

Rx = Qtz Bx, Gray, Silic, Very Hard

some FeOx, Trace Sulfides

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM & JWB

DATE 5/18/80 **LJM & A** No. 1013

PROJECT Simon Mine

LOCATION Adit Level - Main Drift

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER ______

N S
E W

SAMPLE DESCRIPTION

5' channel

- Rx = qtz bx [illegible] - fairly siliceous

+ 1 ft dike

- possibly some qtz/dike bx

1st foot [illegible]

ASSAYED FOR: (Au Ag Cu Pb Zn) OTHER ______

SAMPLER ______

DATE 5/18/80 **LJM & A** No. 1016

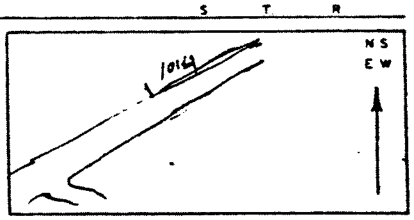
PROJECT Simon Mine

LOCATION Adit Level - Powder Mag Dr

[illegible]

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER ______



SAMPLE DESCRIPTION

5' Channel - Rx = hard silicified [illegible]

[illegible]

- [illegible]

[illegible]

(Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

LJM & JWB

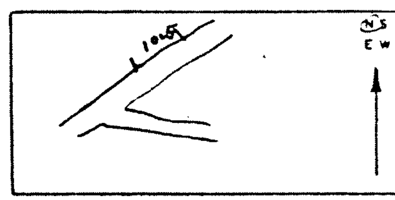
DATE 5-18-80 **LJM & A** No. 1015

PROJECT Simon Mine

LOCATION Adit Level, Powder Mag Dr.

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER ______



SAMPLE DESCRIPTION 5' Channel

Rx = Qtz Bx, Gray, Hard, Silic

Except some Softer Mat.

FeOx

Minor Sulfides

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM & JWB

DATE 5-19-80 LJM & A No. 1018

PROJECT Simon Mine

LOCATION Adit Level - Powder Mag. Dr.

S T R

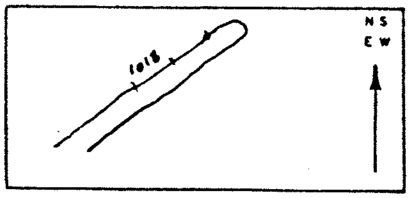
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel Sample

Rx = Qtz Bx, Gray, Hard, Silic.

Some Fe Ox

Minor Sulfides

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM & JWB

DATE 5-18-80 LJM & A No. 1017

PROJECT Simon Mine

LOCATION Adit Level - Powder Mag. Dr

S T R

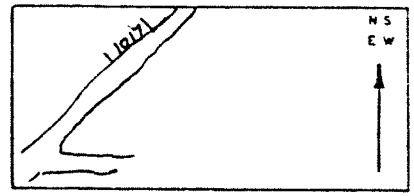
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Qtz Bx, Gray, Silic, Hard

Some Fe Ox

Minor Sulfides

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM & JWB

DATE 5-19-80 LJM & A No. 1020

PROJECT Simon Mine

LOCATION Adit Level Powder Mag Dr

S T R

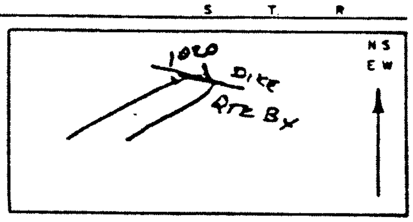
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel 2 Bags

Rx = Qtz Bx - Gray In Contact With Dike, Some Fe Ox, Hem Along Contact, Some Sulfides, Dike Gray & Hard Bx

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM / JWB

DATE 5/19/80 LJM & A No. 1019

PROJECT Simon Mine

LOCATION Adit Level Powder Mag. Dr

S T R

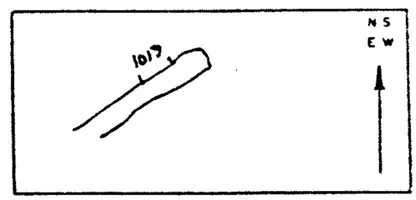
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

5' channel 2 Bags

- Rx = qtz breccia - some oxidized sulphides

- [illegible] hard

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM / JWB

DATE 5-19-80 **LJM & A** No. 1022

PROJECT Simon Mine

LOCATION Adit Level East Stope

S T R

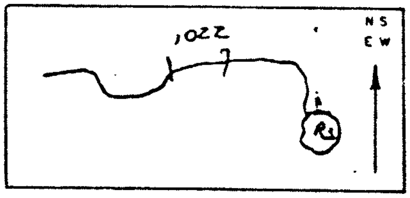
SAMPLE TYPE

(Rock) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Ox & Limo & Hem Stained Qtz Bx

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5/18/80 **LJM & A** No. 1021

PROJECT Simon Mine

LOCATION Adit Level - East Stope

S T R

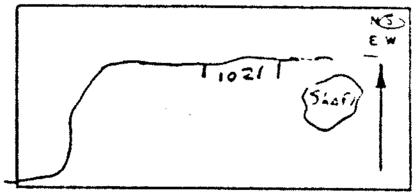
SAMPLE TYPE

(Rock) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION

5 foot channel

Rx = heavily oxidized - limonitic hematitic qtz breccia

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER JWB/LJM

DATE 5-19-80 **LJM & A** No. 1024

PROJECT Simon Mine

LOCATION Adit Le

S T R

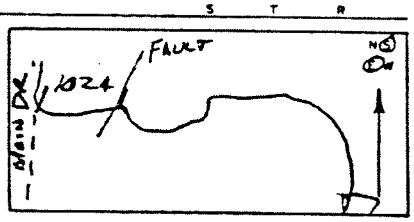
SAMPLE TYPE

(Rock) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Ox, Limo, Hem, Clayey Soft

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM

DATE 5-19-80 **LJM & A** No. 1023

PROJECT Simon Mine

LOCATION Adit Level - East Stope

S T R

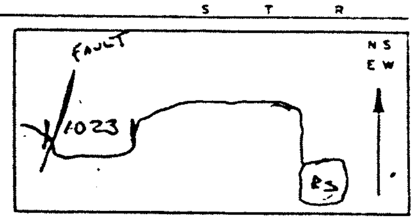
SAMPLE TYPE

(Rock) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Ox & Limo & Hem Qtz Bx Soft

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

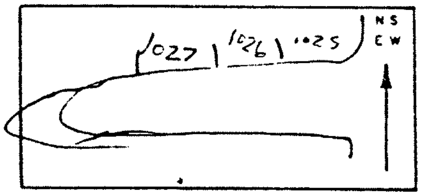
DATE 5/19/80 **LJM & A** No. 1026

PROJECT Simon Mine

LOCATION Adit Level - South X-cut

S T R

SAMPLE TYPE: ROCK (circled) · SOIL · SEDIMENT · OTHER



SAMPLE DESCRIPTION

5 ft channel

– Rx = s/a 1025, i.e. [illegible]

breccia with local oxidized

sulphide stringers

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

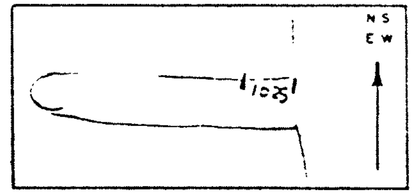
DATE 5/20/80 **LJM & A** No. 1025

PROJECT Simon Mine

LOCATION Adit Level – South X-cut

S T R

SAMPLE TYPE: ROCK (circled) · SOIL · SEDIMENT · OTHER



SAMPLE DESCRIPTION

5' channel

Rx = gray gouge - soft breccia

with local highly oxidized

pods & stringers

Also: 1st 5' of old mine channel &

someone's sample # 15 with

silver paint

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

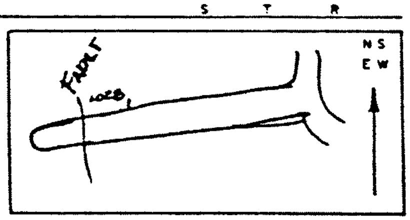
DATE 5/19/80 **LJM & A** No. 1028

PROJECT Simon Mine

LOCATION Adit Level - So. X-Cut

S T R

SAMPLE TYPE: ROCK (circled) · SOIL · SEDIMENT · OTHER



SAMPLE DESCRIPTION 6½ Ft Channel 2 Bags

Rx = Gray - Red Brown - Gougy -

Soft, Hem, Bx

Some Malachite

Mn Ox & Possibly Cu Ox

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

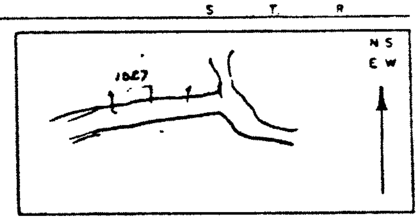
DATE 5-20-80 **LJM & A** No. 1027

PROJECT Simon Mine

LOCATION Adit Level – So. X-Cut

S T R

SAMPLE TYPE: ROCK (circled) · SOIL · SEDIMENT · OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Gray, Gougy, Soft Bx

w/ Local Limo Zone &

Becoming Hem in SW

End of Sample, Mn Ox

Staining Also

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LM/JWB

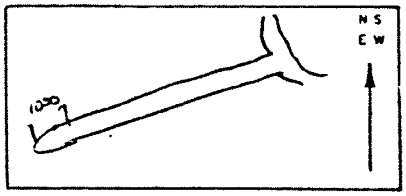
DATE 5-20-80 **LJM & A** No. 1030

PROJECT Simon Mine

LOCATION Adit Level - So. X-Cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 4½' Channel to Face 2-Bags

Rx = White, Hem-Limo Stained, Talc, Bx

Some Mn Ox

Minor Sulfide Ox

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

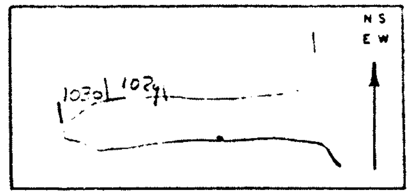
DATE 5/19/80 **LJM & A** No. 1029

PROJECT Simon Mine

LOCATION Adit Level - South X-cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION

5 foot channel - 2 bag

Rx = White - Talc' [illegible]

with pervasive hematitic &

limonitic oxidation - & with

some [illegible] & [illegible] of

[illegible]

ASSAYED FOR: (Au) (Ag) (Cu) Pb (Zn) OTHER

SAMPLER

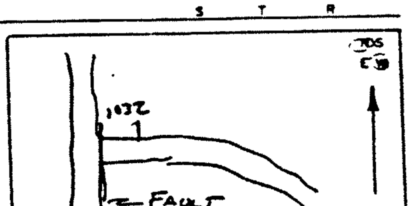
DATE 5-20-80 **LJM & A** No. 1032

PROJECT Simon Mine

LOCATION Adit Level - No. X cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Gray, Talc, Soft Gougy Bx, Some Limo Staining

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5/19/80 **LJM & A** No. 1031

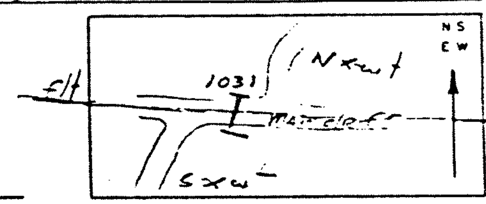
PROJECT Simon Mine

LOCATION Adit Level - Main drift

½ way between North & S. X-cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION

5 foot channel - 2 bags - Across back

& ½ way down rib

Rx = Soft gouge gray breccia

crossing fault zone - talc [illegible]

- heavily limonitic & hematitic staining in

fault stockwork itself - + some MnO₂

or Blk Coating

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5/19/80 **LJM & A** No. 1034

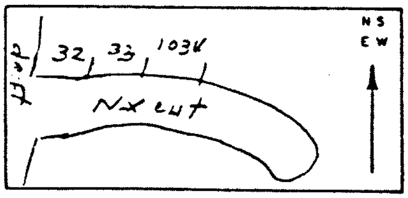
PROJECT Simon Mine

LOCATION Adit Level - North X-cut

S T R

SAMPLE TYPE

(ROCK) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION

5' channel

Rx = ?? - qtz breccia - silicified bx - moderate oxidized sulphides + staining -

- generally does not appear to be mineralized

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5-20-80 **LJM & A** No. 1033

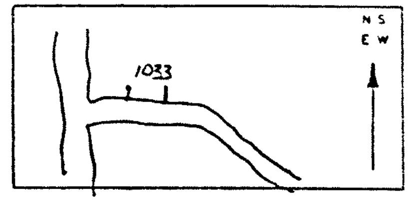
PROJECT Simon Mine

LOCATION Adit Level - No. X cut

S T R

SAMPLE TYPE

(ROCK) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Gray, Gougy, Soft, Talc, Bx, Qtz Bx ?? , Limo & Hem staining

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5/19/80 **LJM & A** No. 1036

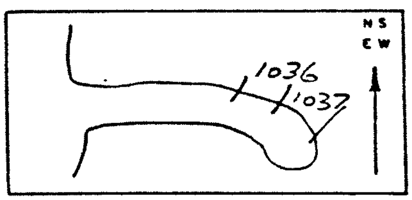
PROJECT Simon Mine

LOCATION Adit Level - N. X cut

S T R

SAMPLE TYPE

(ROCK) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION

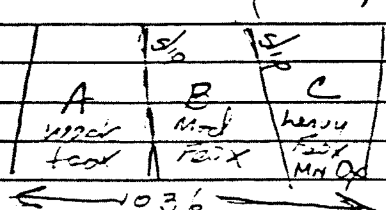
5 foot Channel

Rx - qtz breccia?

(A) 1 foot - clayey white few sulphides

(B) 2.5 feet - moderate oxidized sulphides

(C) 1.5 feet - heavy sulphides



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5/19/80 **LJM & A** No. 1035

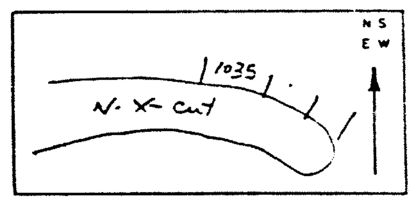
PROJECT Simon Mine

LOCATION Adit Level - North X-Cut

S T R

SAMPLE TYPE

(ROCK) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION

5 foot channel -

Rx = qtz breccia - silicified clasts - with some clay between clasts -

weak - mod oxidized sulphides

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

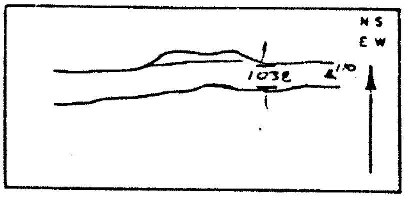
DATE 5-20-80 **LJM & A** No. 1038

PROJECT SIMON MINE

LOCATION ADIT LEVEL - MAIN DR 15 FT NW OF PT 110

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL 3 BAGS

RX = HEM, GOUGY, SOFT, BX

HEAVY MIN, CuOx, MnOx

MALACHITE

SAMPLE TAKEN ACROSS

MAJOR FAULT STRUCTURE

ASSAYED FOR: (Au) (Ag) (Cu) Pb Zn OTHER

SAMPLER LJM / JWB

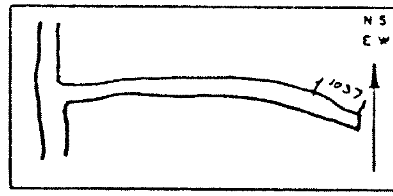
DATE 5-20-80 **LJM & A** No. 1037

PROJECT SIMON MINE

LOCATION ADIT LEVEL - NO. XCUT

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5½ FT CHANNEL 2 BAGS

RX = QTZ BX?, Fe Ox & Mn Ox

GRAY - BROWN, SULFIDE OX

SILIC, FINE TEXTURE

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

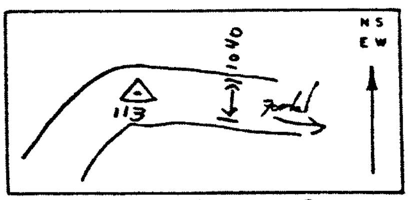
DATE 5/19/80 **LJM & A** No. 1040

PROJECT SIMON MINE

LOCATION Adit Level - Main Drift 10 feet NW updrift from Δ113

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 foot channel - 3 bags - Split sample

N. Rib - 1.5 ft lighter - fine grained 'gouge' + hit bags

hematitic staining of FX

Center - F.W. side fault = 2 ft massive crystalline

calcite vein

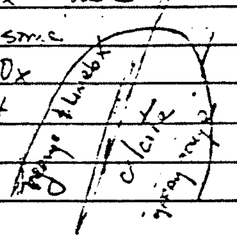
HW) Rib = Lime bx & gouge

with much hematite stain

limonited - some MnOx

& Kaiso cond. dirt

Talcy



Looking NW

ASSAYED FOR: (Au) Ag Cu Pb Zn OTHER

SAMPLER

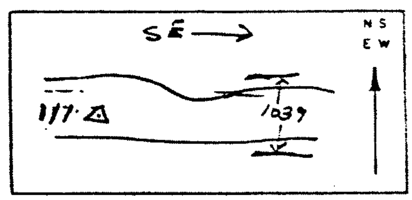
DATE 5/19/80 **LJM & A** No. 1039

PROJECT SIMON MINE

LOCATION Adit Leve - MAIN DRIFT Apx 15 foot down drift from Δ114

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION

foot channel across drift - 3 bags

- RX = massive xtalline calcite veins

with v. heavy MnOx or Blk CuOx on + vugs

H.W. of Calcite vein on N. rib -

- Rx on S. Rib is hematitic stained

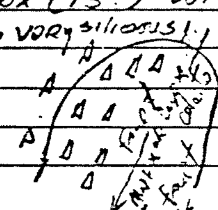
gray bx (ls?) with CuOx & MnOx

some is very siliceous!

Calcite vein = 1 ft

MnOx/CuOx = 2 ft

Bx zone = 2-3 ft



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) Zn OTHER

SAMPLER

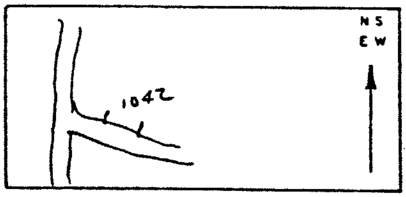
DATE 5-20-80 LJM & A No. 1042

PROJECT Simon Mine

LOCATION Adit Level - E. X cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL

Rx = White Gouge & Hard Layer of Very Silic Rx, w/ Limo & Hem Staining, Dis. Sulfides Some Calcite Fract Fill

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM / JWB

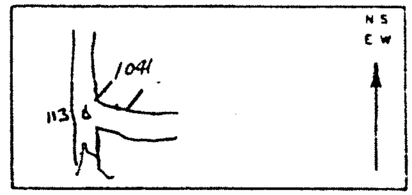
DATE 5-20-80 LJM & A No. 1041

PROJECT Simon Mine

LOCATION Adit Level - E. X cut

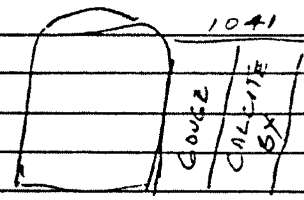
S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL CHIP

Rx = Fault Zone w/ Gouge & Calcite Bx, Some Limo & Hem, Minor Sulfide Ox



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM / JWB

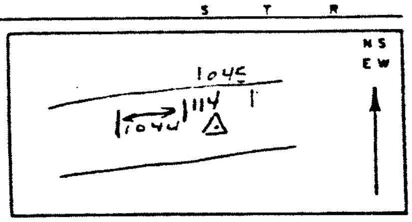
DATE 5/20/80 LJM & A No. 1044

PROJECT Simon Mine

LOCATION Adit Level - East X-cut
1 ft S. of Δ114

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5ft channel - 2 bags

- Rx = gray to dk gray hard v. silicified limestone - Rx is dk fine grained & dense
- note that fracture spaces are filled with a very limonitic (sulfides oxidized) clay
- fresh fine grained pyrite diss. in RX
- some black (MnOx?) coating oxidized fracture fillings

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

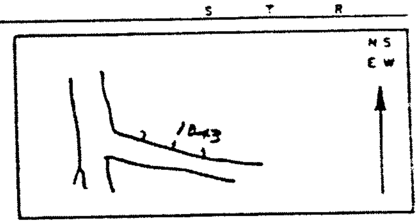
DATE 5-20-80 LJM & A No. 1043

PROJECT Simon Mine

LOCATION Adit Level - E. X cut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL

Rx = Dk Gray Ls? w/ Limo & Hem Staining, Fract Fill of Sulfide Ox, Thin Hard Silic Lay At SW Edge of Sample

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

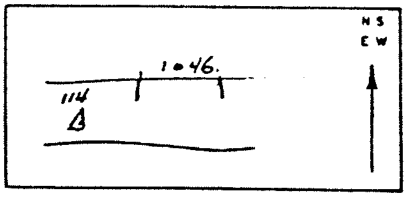
DATE 5/20/80 **LJM & A** No. 1046

PROJECT Simon Mine

LOCATION Adit Level - East X cut

Sample start ≈ 4ft N. of Δ114 S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5ft channel -

Rx = silicified lime as 1044-1045 only difference a fewer amount of Fe ox clay fracture fillings

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

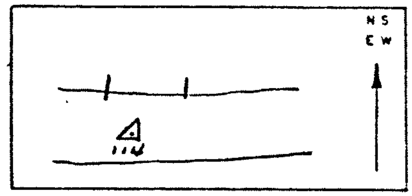
DATE 5/20/80 **LJM & A** No. 1045

PROJECT Simon Mine

LOCATION Adit Level - East X-cut

S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5ft. channel /

Rx = silicified lime as 1044 + still contains fracture fillings of oxidized sulphides + some black coatings (MnOx?) on oxidized sulphide fillings

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

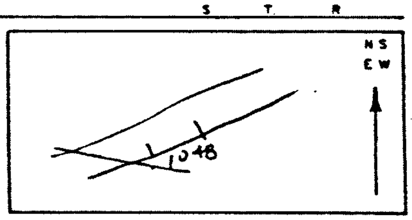
DATE 5-21-80 **LJM & A** No. 1048

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut

S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Lt Gray, Alt. Dike? w/ Minor Sulfides (Py), Soft White Pheno, Calcite on Fract, Some Limo Staining

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM/JWB

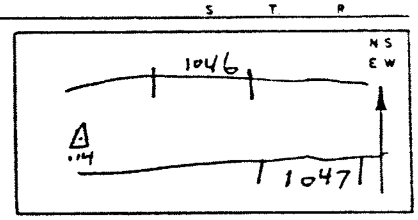
DATE 5/20/80 **LJM & A** No. 1047

PROJECT Simon Mine

LOCATION Adit Level East cross cut

SE - Rib S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5ft channel

Rx = silicified lime - same as previous 3 samples - with the exception of having numerous gray ground coatings - also oxidized sulphides - possibly contains some dike material

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 5-21-80 **LJM & A** No. 1050

PROJECT SIMON MINE

LOCATION ADIT LEVEL - E. XCUT

S T R

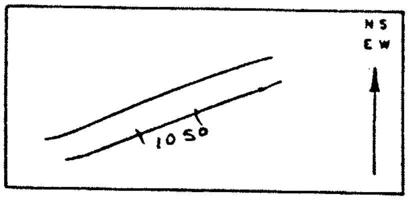
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL

RX = LT GRAY DIKE? W/
CALCITE FRACT FILL,
MINOR SULFIDES, SOFT
WHITE FILL OR ALT. OF
PHENO, SOME LIMO
STAINING & FRACT FILL

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5-20-80 **LJM & A** No. 1049

PROJECT SIMON MINE

LOCATION ADIT LEVEL - E. XCUT

S T R

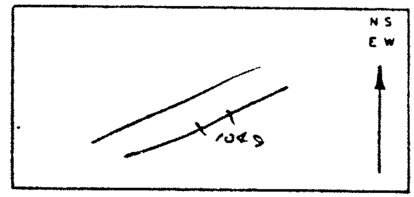
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL 3 BAGS

RX = LT GRAY, ALT, DIKE? W/
MINOR SULFIDES, SOFT
WHITE PHENO, CALCITE
ON FRACT, SOME LIMO
STAINING

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5-21-80 **LJM & A** No. 1052

PROJECT SIMON MINE

LOCATION ADIT LEVEL - E. XCUT

S T R

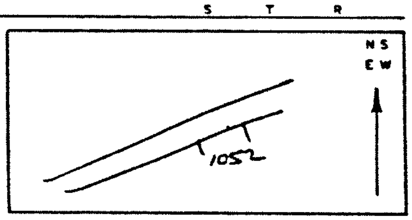
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL

RX = MOD - HEAVY LIMO & HEM
STAINED DIKE? BX W/
CALCITE FILL ON FRACT,
MINOR MN OX

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5-21-80 **LJM & A** No. 1051

PROJECT SIMON MINE

LOCATION ADIT LEVEL - E. XCUT

S T R

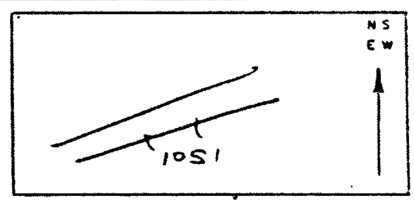
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 FT CHANNEL 2 BAGS

RX = LT GRAY DIKE? W/
CALC. FRACT FILL, MINOR
SULFIDES, WHITE ALT OF
PHENO, SOME LIMO
STAINING & FRACT FILL

ASSAYED FOR: (Au) (Ag) Cu (Pb) (Zn) OTHER

SAMPLER LJM/JWB

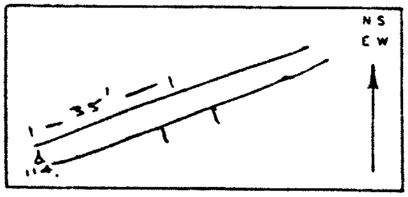
DATE 5-21-80 **LJM & A** No. 1054

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut
≈ 35' From Pt 114

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel 2 Bags
Rx = Gouge & Bx w/ Bx Clasts of Silic Ls w/ Fresh Py & Other Sulfides, Some Limo & Hem Staining, Minor Cu Ox, Gray Gouge, Minor Mn Ox Clots

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM / JWB

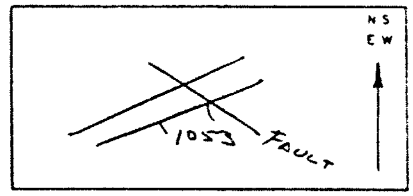
DATE 5-21-80 **LJM & A** No. 1053

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel 2 Bags
Rx = Heavy Hem Stained Ls? Dike? Bx w/ Soft White Gouge Fract Fill, Minor Mn Ox

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM / JWB

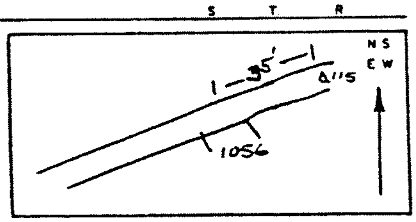
DATE 5-21-80 **LJM & A** No. 1056

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel
Rx = Gray Ls. Bx Along Minor Broken Zone Calcite Along Frac Minor Sulfides Some Limo Staining

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

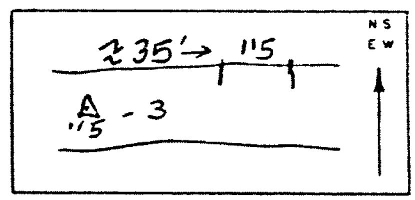
DATE 5/21/80 **LJM & A** No. 1055

PROJECT Simon Mine

LOCATION Adit Level - East X-cut
35ft S. from Δ115

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 foot channel - 1 bag
Rx = Lime breccia -
- note less gouge than 1054 but Rx still clayey & soft
+ both lime breccia clasts & silicified lime clasts
- Mod FeOx on fractures - predominantly limonitic

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

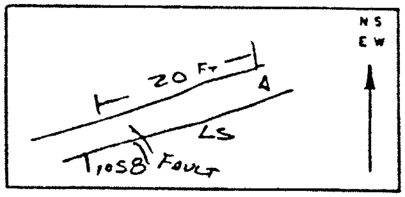
DATE 5-21-80 **LJM & A** No. 1058

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Gray LS Bx w/ Calcite on Fract, Minor Sulfides

Some Limo Staining

Larger LS Frag in Bx

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

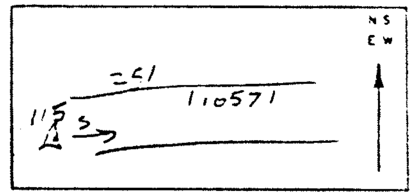
DATE 5/21/80 **LJM & A** No. 1057

PROJECT Simon Mine

LOCATION Adit Level - East X-cut

25' S. of ..., 10 ft from Δ115 S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5ft channel - 1 ...

Rx = Limo bx - becoming more massive

= Clasts are NSW ... black dense LS.

- white calcite veining

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

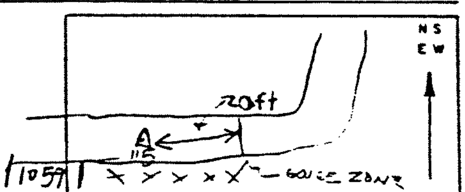
DATE 5/21/80 **LJM & A** No. 1060

PROJECT Simon Mine

LOCATION Adit Level - E. X-cut

from S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION composite chip over 25ft

Rx = Dense black Lime as 1059 sample

Foss. Fine Py

ASSAYED FOR: (Au) Ag (Cu) Pb (Zn) OTHER

SAMPLER LMJ ...

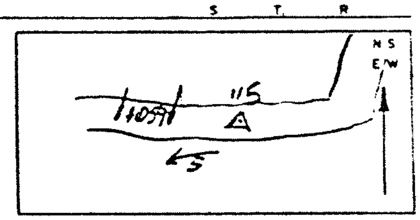
DATE 5/21/80 **LJM & A** No. 1059

PROJECT Simon Mine

LOCATION Adit Level - E. X-Cut

15ft from Δ115 S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5foot channel

RX = v. hard - v. dense - dk gray to black silicified massive limestone

- minor slopes filled with oxidized sulphides

- RX makes sulphur smell when broken

- some small calcite veining

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5-21-80 **LJM & A** No. 1062

PROJECT Simon Mine

LOCATION Adit Level E Xcut

S T R

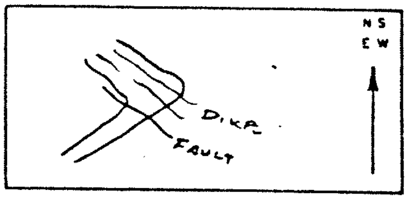
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 4 Ft Channel

Rx = Ls Bx In Gouge Zone On Hanging Wall Of Dike. Prob. Sulfides Some Hem Staining

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5-21-80 **LJM & A** No. 1061

PROJECT Simon Mine

LOCATION Adit Level - E. Xcut

S T R

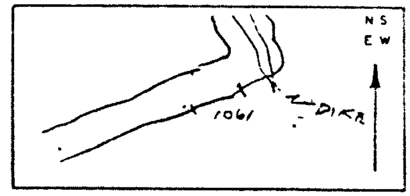
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 7 Ft Channel

Rx = Lt Gray Alt Dike Bx w/ Silic Alt, Dis Py, Cu Ox Limo & Hem Staining On Fract. Located On Hanging Wall Of East Fault. Few Calcite Vug. Qtz Eye Phen Up To 1mm ≈ 5-10%

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

DATE 5-21-80 **LJM & A** No. 1064

PROJECT Simon Mine

LOCATION Adit Level E Xcut

S T R

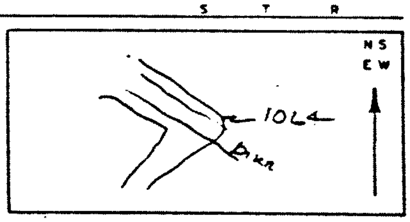
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 2 Ft

Rx = Black Ls Gouge On FW Of Dike, Minor Sulfides & Black Ls Bx

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 5-20-80 **LJM & A** No. 1063

PROJECT Simon Mine

LOCATION Adit Level E Xcut

S T R

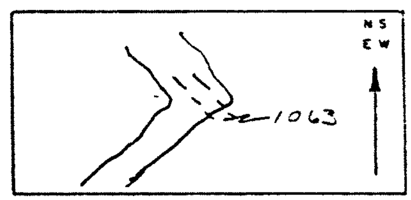
SAMPLE TYPE

(ROCK) — circled

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 3 Ft Channel

Rx = White-Tan Dike Bx w/ Minor Sulfides, Cu Ox, Hem Staining, Very Small Qtz Pheno

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

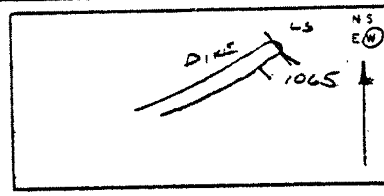
SAMPLER LJM/JWB

DATE 5-30-80 **LJM & A** No. 1065

PROJECT Simon Mine

LOCATION Contact Shaft Adit/Level

S T R



SAMPLE TYPE

(ROCK) [circled]

SOIL

SEDIMENT

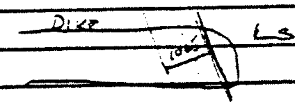
OTHER

SAMPLE DESCRIPTION 3.0 FT Channel

Rx = Fault Gouge / Dike Bx

Moderate MnOx & FeOx

Gray to Yellow White



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) [all circled] OTHER

SAMPLER LJM / JWB

DATE 6-30-80 **LJM & A** No. 1068

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

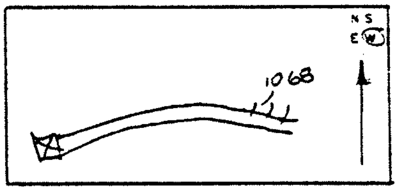
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER ______



SAMPLE DESCRIPTION 5 ft Channel

Rx = Dike Bx, Gray to Gray White w/ MnOx & FeOx on Fract Minor Dis Pyrite, Same As 1067

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM/JWB

DATE 6-30-80 **LJM & A** No. 1069

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

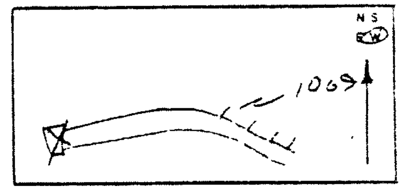
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER ______



SAMPLE DESCRIPTION 5 ft Channel

Rx = Dike Bx Gray White w/ MnOx in Blebs & FeOx on Fract, Dis Pyrite, Same As 1067

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM/JWB

DATE 5-30-80 **LJM & A** No. 1066

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

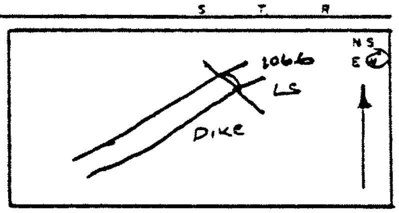
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER ______



SAMPLE DESCRIPTION 3.5 ft Channel

Rx = Silic Ls; Gray Green w/ Blebs of Unalt Ls Gray w/ Sugary Texture Fract Coated w/ Heavy MnOx & FeOx Also Calcite on Fract

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM/JWB

DATE 6-30-80 **LJM & A** No. 1067

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

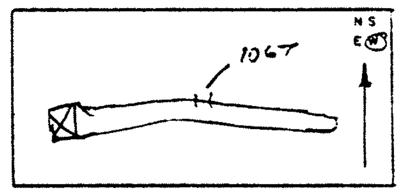
SAMPLE TYPE

(ROCK)

SOIL

SEDIMENT

OTHER ______



SAMPLE DESCRIPTION 5 ft Channel

Rx Qtz Bx/Dike Bx, Blocky w/ Minor Gouge, MnOx & FeOx on Fract & Minor in Gouge, Larger Bx Pieces Are Gray Green to Gray White Minor Dis Pyrite, MnOx in Blebs, Bx Air Slacks to Fine White Coating

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ______

SAMPLER LJM/JWB

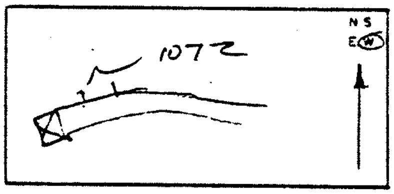
DATE 6-30-80 **LJM & A** No. 1072

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level
10 ft From Shaft

S T R

SAMPLE TYPE
(ROCK) circled
SOIL
SEDIMENT
OTHER ____



SAMPLE DESCRIPTION 5 ft Channel
Rx = Dike / Qtz Bx Soft
White Gray Gouge
w/ Mn Ox Blebs &
Fe Ox, Some Calcite
Fillings, Near
Contact w/ LS

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ____

SAMPLER LJM/JWB

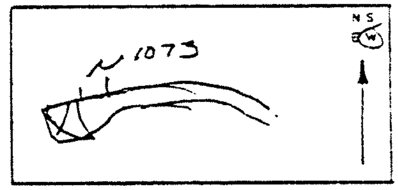
DATE 5-30-80 **LJM & A** No. 1073

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

SAMPLE TYPE
(ROCK) circled
SOIL
SEDIMENT
OTHER ____



SAMPLE DESCRIPTION 5 ft Channel
Rx = Dike / Qtz Bx, White
Gray Gouge w/
Mn Ox Blebs & Fe Ox
Galena, Some Calcite
Fillings, Near
Contact w/ LS (5-8 ft)

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ____

SAMPLER LJM/JWB

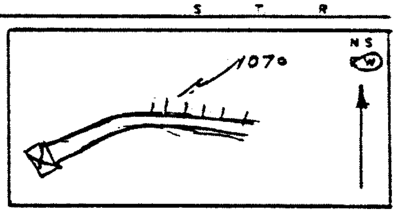
DATE 6-30-80 **LJM & A** No. 1070

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

SAMPLE TYPE
(ROCK) circled
SOIL
SEDIMENT
OTHER ____



SAMPLE DESCRIPTION 5 ft Channel
Rx = Dike Bx, Gray White
w/ Mn Ox & Fe Ox
on Fract, Dis Py
Same As 1067

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ____

SAMPLER LJM/JWB

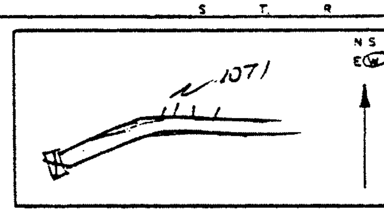
DATE 6-30-80 **LJM & A** No. 1071

PROJECT Simon Mine

LOCATION Contact Shaft Adit Level

S T R

SAMPLE TYPE
(ROCK) circled
SOIL
SEDIMENT
OTHER ____



SAMPLE DESCRIPTION 5 ft Channel
Rx = Dike Bx, Gray White
w/ Mn Ox & Fe Ox on
Fract, Dis Pyrite
Same As 1067

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER ____

SAMPLER LJM/JWB

DATE 6/1/80 **LJM & A** No. 1076

PROJECT Simon Mine

LOCATION No 2 Shaft - Drift

S T R

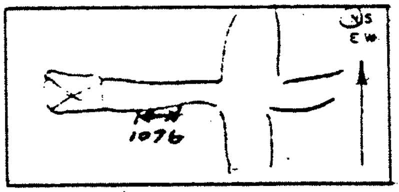
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 22ft Channel

Rx = Dike/gouge (1.2ft thick)
following fault structure
— Rk is Talcy - white with
Hematitic staining on slopes

ASSAYED FOR: Au Ag Cu Pb Zn (struck through) OTHER

SAMPLER

DATE 6/1/80 **LJM & A** No. 1077

PROJECT Simon Mine

LOCATION No 2 Shaft . drift . S. leg

S T R

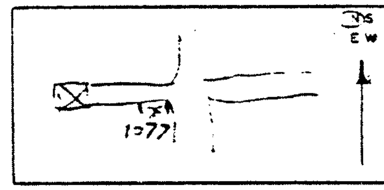
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 foot channel

Rx = gray limestone - with FeOx
(& Hematitic staining of Fx &
with Fx fillings of FeOx stained
calcite
* Note: - sample hard to take - v.
hard to get [illegible] w. chisel

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

SAMPLER

DATE 5-31-80 **LJM & A** No. 1074

PROJECT Simon Mine

LOCATION Short Adit ≈ 100 Ft SW
Of No 2 Shaft

S T R

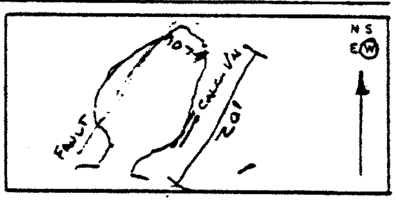
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = LS Bx, Between Two
Faults, Very Heavy FeOx,
MnOx, CuOx, Soft

Note: This is on SE Extension
of Simon Adit Level Workings

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

SAMPLER LJM/JWB

DATE 5-31-80 **LJM & A** No. 1075

PROJECT Simon Mine

LOCATION Outside Adit ≈ 100 Ft SW
No. 2 Shaft

S T R

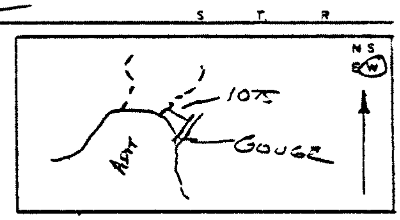
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 4 Ft Channel

Rx = Massive Calcite V/N
Running Parallel To
Fault Structures. Very
Hard Dark Brown ≈ Blk
Calcite, FeOx, Limo
On Fractures

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

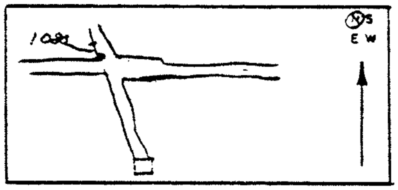
SAMPLER LJM/JWB

DATE 6-1-80 **LJM & A** No. 1080

PROJECT Simon Mine

LOCATION No 2 Shaft 55ft Level Main X cut S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5 ft Channel

Rx = LS Bx on Footwall of Major E-W Fault. Soft Gray Gougy, FeOx, MnOx, Limo-Hem Stained, Calcite Veining, Possibly Some Dike Bx Mixed In

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

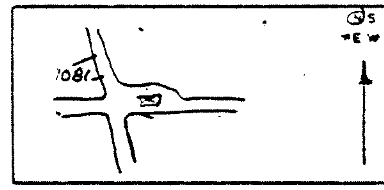
SAMPLER EJM/JWB

DATE 6-1-80 **LJM & A** No. 1081

PROJECT Simon Mine

LOCATION No 2 Shaft 55ft Level Main X cut S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 5ft Channel

Rx = Dike Bx, Lt Gray Fract Dike w/ Minor Sulfides, Limo Staining, MnOx, Calcite Veining. On Hanging Wall of Major E-W Fault

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

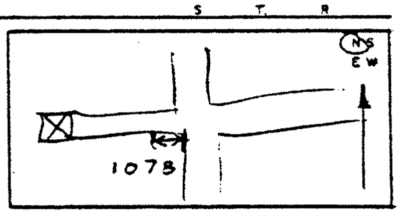
SAMPLER

DATE 6/1/80 **LJM & A** No. 1078

PROJECT Simon Mine

LOCATION No 2 shaft - S. Lag drift S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION 3.5 ft channel

Rx = variably sheared - dike & Limo Bx - with pervasive FeOx & hematite oxides - minor - MnOx + thin calcite veinlets

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

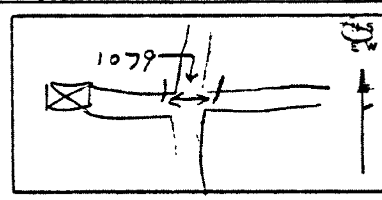
SAMPLER

DATE 6/1/80 **LJM & A** No. 1079

PROJECT Simon Mine

LOCATION No-2 Shaft - intersection X-cut & E-W drift S T R

SAMPLE TYPE
- ROCK (circled)
- SOIL
- SEDIMENT
- OTHER



SAMPLE DESCRIPTION

Rx = dike & Limo bx - predominantly dike - with heavy FeOx/hematite zones -

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

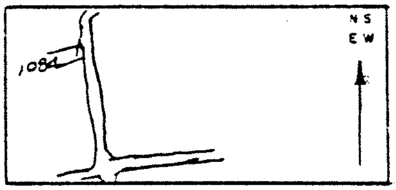
SAMPLER

DATE 6-1-80 **LJM & A** No. 1084

PROJECT Simon Mine

LOCATION No 2 Shaft 55 Ft Level Main X Cut S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Dike Bx, Lt Gray, Limo & Hem Stained, MnOx, Minor Sulfides, Very Fine Graine Dike & Alt.

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

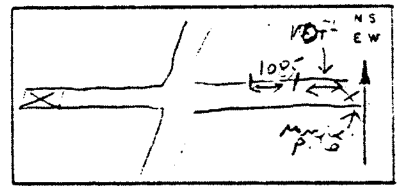
SAMPLER LJM/JWB

DATE 6/1/80 **LJM & A** No. 1085

PROJECT Simon Mine

LOCATION No. 2 Shaft - 55 Level Main X-Cut S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 ft channel

Rx = altered - oxidized dike - ± [illegible] with heavy oxidized sulphides also - [illegible] MnOx & minor calcite veinlets

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

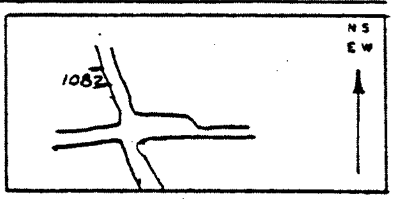
SAMPLER

DATE 6-1-80 **LJM & A** No. 1082

PROJECT Simon Mine

LOCATION No 2 Shaft 55 Ft Level Main X Cut S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Dike Bx, Lt Gray Fract Dike w/ Limo Staining, Mn Ox, Minor Sulfides, Calcite Vning

ASSAYED FOR: (Au) (Ag) (Cu) Pb (Zn) OTHER

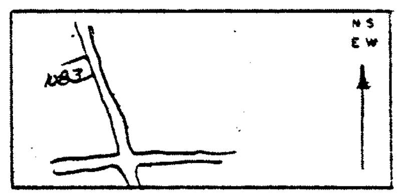
SAMPLER LJM/JWB

DATE 6-1-80 **LJM & A** No. 1083

PROJECT Simon Mine

LOCATION No 2 Shaft 55 Ft Level Main X Cut S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 Ft Channel

Rx = Dike Bx, Limo & Hem Stained, Mn Ox, Sericite Alt, Some LS Frag.

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

DATE 6/1/80 **LJM & A** No. 1088

PROJECT Simon Mine

LOCATION No-2 Shaft - 55 Level - N. end of MAIN X-cut

S T R

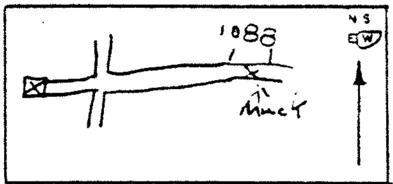
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5ft channel

- Rx = dike as 1087 - cutting calcite vein (1.5-2") with Phs & sph & that vein is intersected by a 1/2" vein carrying Phs & sphal

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 6/2/80 **LJM & A** No. 1089

PROJECT Simon Mine

LOCATION No. 2 Shaft - Face - West end [illegible]

S T R

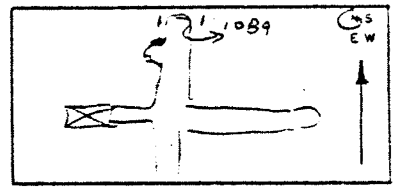
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 3 foot channel

RX = Brecciated ls. & dike with pervasive strong FeOx staining & with some calcite vugs - & with fairly strong MnOx dots/blebs & staining

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 6/1/80 **LJM & A** No. 1086

PROJECT Simon Mine

LOCATION No-2 Shaft - 55 Level - Main X-cut - North

S T R

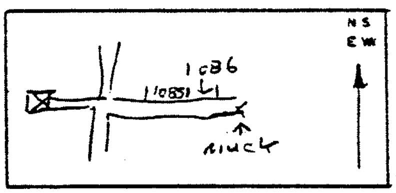
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5ft channel

RX = Altered dike - gouge & bx..
- heavy FeOx + MnOx
+ Minor thin calcite veinlets

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 6/1/80 **LJM & A** No. 1087

PROJECT Simon Mine

LOCATION 55 Level - No 2 Shaft Main X-cut - N end

S T R

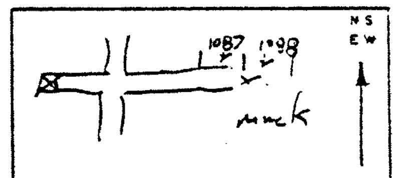
SAMPLE TYPE

ROCK (circled)

SOIL

SEDIMENT

OTHER



SAMPLE DESCRIPTION 5ft. channel

Rx = gray green - dike (silicified Lime?) Relatively massive & compact - cut by thin calcite veinlets with Phs & Sphalerite selvages
- Rx also has a weak rusty brown disseminated material in v. thin stringers - that may be sulphides

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

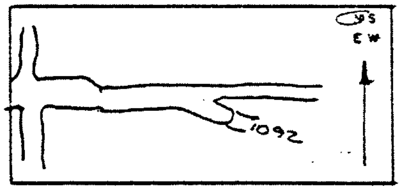
SAMPLER

DATE 6-2-80 **LJM & A** No. 1092

PROJECT Simon Mine

LOCATION No. 2 Shaft 55ft Level E. Drift P.Mag. Face S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5ft Channel

Rx = Ls Bx, Heavy Limo & Hem Staining, Gougy, Wht Gougy Streaks, Some Hard Blocky Gray Ls

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

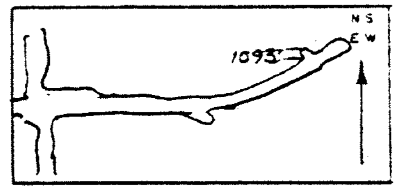
SAMPLER

DATE 6-2-80 **LJM & A** No. 1093

PROJECT Simon Mine

LOCATION No 2 Shaft 55ft Level E. Drift S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 3ft Channel

Rx = Wht Alt Dike w/ Some Limo Stain & Minor Sulfides, Mn Ox

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

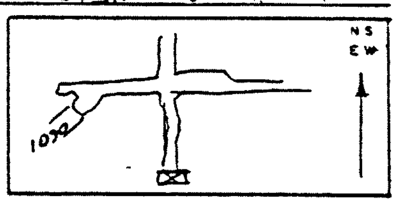
SAMPLER LJM/JWB

DATE 6-2-80 **LJM & A** No. 1090

PROJECT Simon Mine

LOCATION No. 2 Shaft 55ft Level W. Drift S. Slash S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 6ft Channel

Rx = Ls Bx Between Parallel Faults, Limo & Hem Stained Mn Ox

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

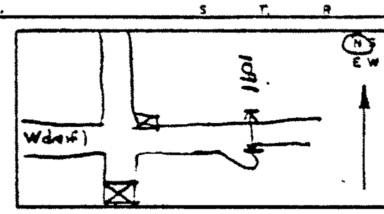
SAMPLER LJM/JWB

DATE 6/2/80 **LJM & A** No. 1091

PROJECT Simon Mine

LOCATION No-2 Shaft - E. drift - across bk N. of powder Mg. S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 6-ft channel

Rx = L.S. Bx - partially mineralized & w. v. heavy oxidized sulfides - some minor dike/gouge material

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

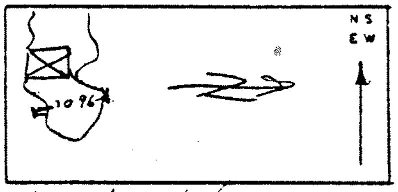
DATE 6/2/80 **LJM & A** No. 1096

PROJECT Simon - Mine

LOCATION No 2 Shaft - 25 Level stope

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER

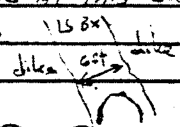


SAMPLE DESCRIPTION 4 foot channel Rib/bk

Rx = Lime bx with heavy oxidized Sulphides

Rx = also contains some white altered dike material injected along fx

Note - ore zone at this locality is 6 feet wide



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

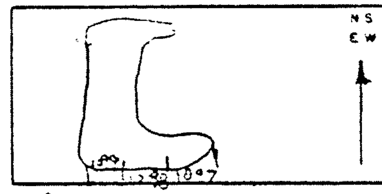
DATE 6/2/80 **LJM & A** No. 1097

PROJECT Simon Mine

LOCATION Cu Pit - South Face - No. 2 Shaft area - ~~South~~ East 150 ft

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5 foot channel

Rx = Limestone bx - soft & altered

pervasive CuOx staining -

possibly some AgBr - Bright green

CuOxides = Az, Mal, Chrysocolla, & Black CuOx oxides

Also FeOx along fx

Sample across structural trend

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

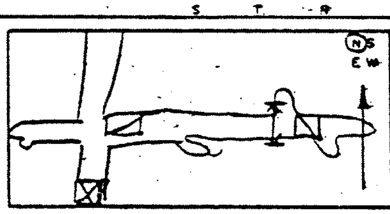
DATE 6/2/80 **LJM & A** No. 1094

PROJECT Simon Mine

LOCATION No 2 Shaft - E drift - across back

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION

Rx = Altered LS bx & Dike bx injected along shears - strong oxidation of sulphides - both strong hematitic & FeOx staining and MnOx + filled stringers & fx of oxidized sulphides -

- bk also contains Fresh galena - ass. with dk Brn oxidized py? rods & Bright Red oxide which seems to develope on a whitish material - dike? ZnO?

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

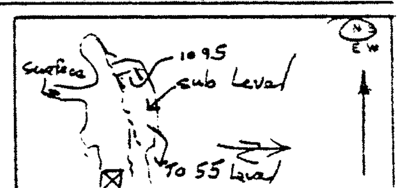
DATE 6/2/80 **LJM & A** No. 1095

PROJECT Simon - Mine

LOCATION No. 2 Shaft - West End - sub level of - surface stope

S T R

SAMPLE TYPE: (ROCK) SOIL SEDIMENT OTHER



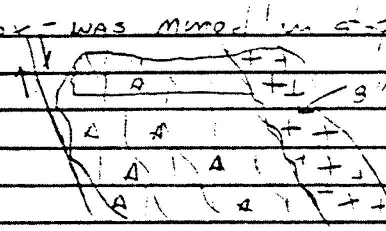
SAMPLE DESCRIPTION 4 foot Rib channel

Rx = LS BX & dike -

LS Bx = heavy oxidized sulphides

dike - white Talcy gouge with some FeOx & MnOx staining on fx

- LS bx - was mined in stope



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

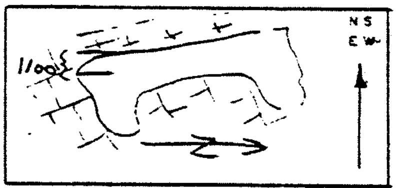
SAMPLER

DATE 6/2/80 **LJM & A** No. 1100

PROJECT Simon Mine

LOCATION Cu Pit - South Face - ≈ 200/150 ft ~~North~~ West of No 2 SHAFT

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 3 ft channel

Rx = altered LS BX - heavy hematite staining + weaker FeOx - pervasive - CuOx (grn) + black CuOx?

Sample is HW zone of Dike & this zone was formerly mined

- Sample across structural zone

Sample 1101 on Backside →

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

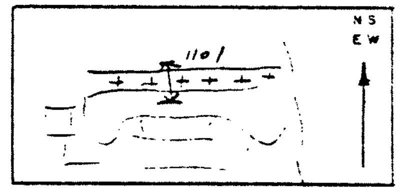
SAMPLER

DATE 6/2/80 **LJM & A** No. 1101

PROJECT Simon Mine

LOCATION Cu Pit - S Face dike - ≈ 200 West of No-2 Shaft Area

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 4 ft channel

Rx = dike BX with silicified lime & non silicified LS clasts

- has strong red hematitic staining & strong FeOx + pervasive CuOx's staining

- sample across dike

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

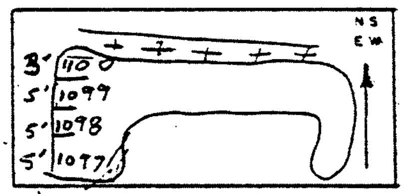
SAMPLER

DATE 6/2/80 **LJM & A** No. 1098

PROJECT Simon Mine

LOCATION Cu Pit - S. Face - ≈ 200 ft West of No 2 Shaft Area

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 ft channel

Rx = altered Lime BX - with pervasive CuOx's & possible AgBr, - FeOx along shears

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

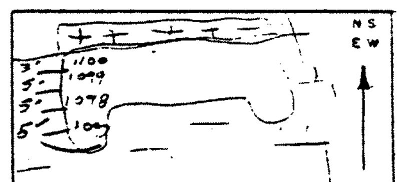
SAMPLER

DATE 6/2/80 **LJM & A** No. 1099

PROJECT Simon Mine

LOCATION Cu Pit - South Face - 200 ft West of No 2 shaft Area

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 ft channel across structure

Rx = altered lime Bx - pervasive CuOx (green & Black) - with limonite on fr

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

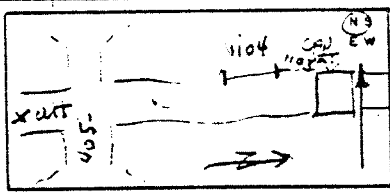
DATE 6/5/80 **LJM & A** No. 1104

PROJECT Simon Mine

LOCATION No 3 shaft - 353 Level - S. X-cut

Just N. of 405 stope area S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 foot channel

Same Rx as sample 1103

Rx = Dike Bx - heavy red oxides + CuOx salts

= clasts = qtz

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

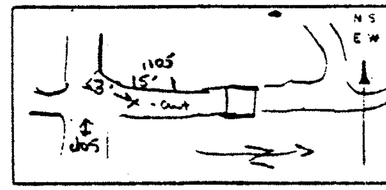
DATE 6/5/80 **LJM & A** No. 1105

PROJECT Simon Mine

LOCATION No. 3 shaft 353 Level - S. X-cut

405 stope area S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5-ft channel

Rx = dike bx - heavy CuOx salts + heavy

red (hematite) oxides -

Rx is similar to 1103 & 1104 samples - but

is a gray green color and was more

CuOx - & less Red ox

Rx also contains fresh unoxidized py

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

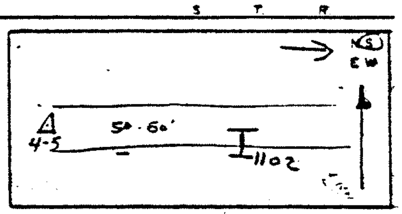
DATE 6/5/80 **LJM & A** No. 1102

PROJECT Simon Mine

LOCATION No. 3 Shaft - 353 Level - S-X-cut

S T R

SAMPLE TYPE: ROCK (circled) / SOIL 1-3' / SEDIMENT / OTHER



SAMPLE DESCRIPTION 2 ft - Back sample across

2 Parallel faults

Rx = heavily oxidized py & feox

weak ox → Chrysocolla? - gouge - oxidized

- some calcite ~~vein~~ clasts

zone Runs along x cut - 100-125

feet - zone width varies from 1-3 ft

→ zone also contains some CuOx salts -

probably $CuSO_4 \cdot x \cdot H_2O$

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

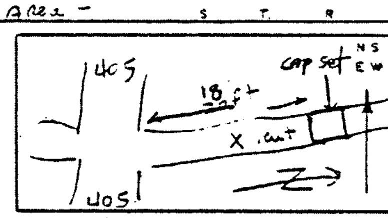
DATE 6/5/80 **LJM & A** No. 1103

PROJECT Simon Mine

LOCATION No 3 shaft - 353 Level - S. X cut

in 405 stope area - S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 ft channel

Rx = Dike bx & gouge - extreme

oxidation - much bright red oxidation

+ CuOx salts (copper SO4)

- Bx clasts - are hard & silicified -

& mostly qtz -

- Rx resembles qtz bx on adit level

- sample is near HW of ore zone

≈ 8 feet from HW fault

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

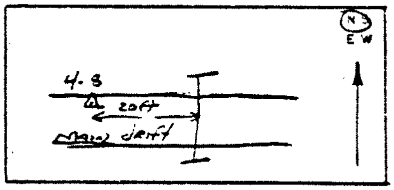
SAMPLER

DATE 6/6/80 **LJM & A** No. 1108

PROJECT Simon Mine

LOCATION No 3 shaft - main drift - 353 level
≈ 20 ft E. of Δ 4-3 S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5 ft across back

Rx = highly mineralized dike BX & gouge ~~pest~~ 10-20% Total sulphides

- Mineralization = PbS ZnS, Cu-S & py both disseminated & veinlets & blebs & clots - py shows minor (start) Replacement by Chalcocite
- Rx also contains considerable sericite & some calcite veinlets & clots
- oxidation is weak - weak Tarnish on Cp
- Sphalerite is black generally - some zonation of black sp around red sp

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

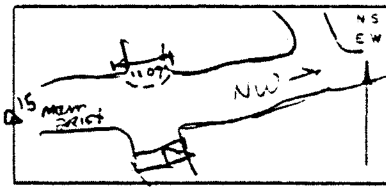
SAMPLER

DATE 6/6/80 **LJM & A** No. 1109

PROJECT Simon Mine

LOCATION No 3 Shaft - Main drift 353 Level - Stope area
≈ 35 ft NW of Δ 15 S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION grab sample across stope area

Rx = dike & dike BX
= heavy sulphide Ga, Sp, Minor Cp
- oxidation - weak
- some massive sulphides in dump

ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

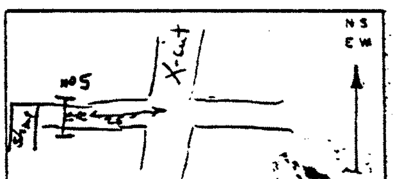
SAMPLER

DATE 6/5/80 **LJM & A** No. 1106

PROJECT Simon Mine

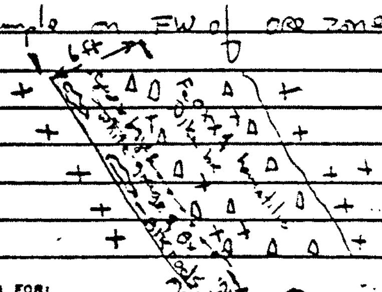
LOCATION No 3 shaft - 353 level - S. X-cut
405 stope area S T R

SAMPLE TYPE: ROCK / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION Back Sample

- Rx = qtz bx - heavily oxidized
- Rx = same as 1105 & 1104 - with diff in that oxidation is more limonitic
- Sample on FW of ore zone



ASSAYED FOR: Au Ag Cu Pb Zn (circled) OTHER

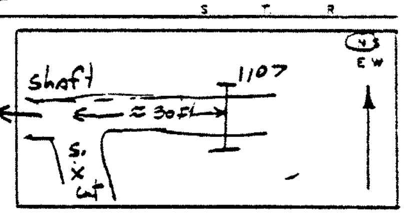
SAMPLER

DATE 6/6/80 **LJM & A** No. 1107

PROJECT Simon Mine

LOCATION No. 3 shaft - Main E-W drift 353-Level ≈ 30 ft E. of S. X-cut S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION Chip - across Bk

Rx = dike - & dike gouge with sulphides
- dike - is fresh & hard w minor diss. sulphides - py & cp
- dike gouge is soft & full of diss py - & sericite - oxidation is minor to Limonite
- purpose of sample is for background comparison

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

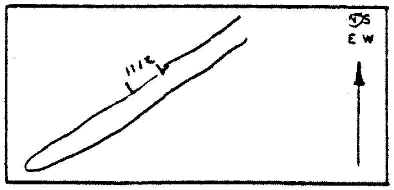
DATE 6-7-80 **LJM & A** No. **1112**

PROJECT Simon Mine

LOCATION SW Adit ≈ 60ft In

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5ft Channel

Rx = Dike Bx, w/ 2½ ft of Hem Staining & Calcite and 2½ ft of Limo Staining, Gougy

ASSAYED FOR: Au, Ag, Cu, Pb, Zn (circled) OTHER

SAMPLER LJM/JWB

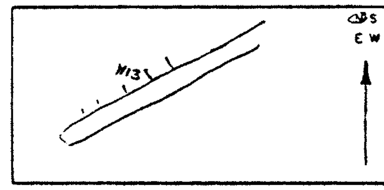
DATE 6-7-80 **LJM & A** No. **1113**

PROJECT Simon Mine

LOCATION S.W. Adit ≈ 65ft In

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION 5ft Channel

Rx = Dike Bx w/ Hem & Limo Staining, MnOx

Note: Probably Dike Bx is the same as Qtz Bx in No. 1 Shaft Adit Level

ASSAYED FOR: Au, Ag, Cu, Pb, Zn (circled) OTHER

SAMPLER LJM/JWB

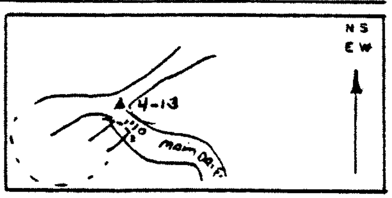
DATE 6/6/80 **LJM & A** No. **1110**

PROJECT Simon Mine

LOCATION No 3 Shaft - Main drift - 353 level Stope gob - 5ft SE of Δ4-13

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION Stope gob - grab

Rx = highly mineralized dike & dike Bx same as sample 1109

-- fresh gn & sp & cp - dessiminated, in clots & veinlets in Rx ≈ est ≈ 10% total sulphides

— Assume stope above is same material

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

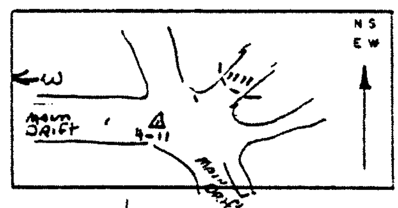
DATE 6/6/80 **LJM & A** No. **1111**

PROJECT Simon Mine

LOCATION No 3 Shaft - 353 Level - Main drift stope gob

S T R

SAMPLE TYPE: ROCK (circled) / SOIL / SEDIMENT / OTHER



SAMPLE DESCRIPTION Grab - Stope gob

Rx = (80%) dike & silicified Lime (20%)

- < 5% visible sulphides

- minor oxidation

ASSAYED FOR: Au, Ag, Cu, Pb, Zn (circled) OTHER

SAMPLER

DATE 6-8-80 **LJM & A** No. 1116

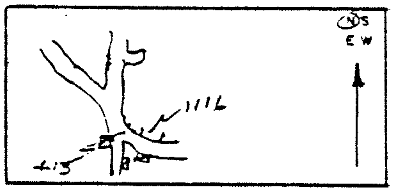
PROJECT Simon Mine

LOCATION 353 Level Main Dr

10 Ft From 4-13 S T R

SAMPLE TYPE

(ROCK) — circled
SOIL
SEDIMENT
OTHER



SAMPLE DESCRIPTION 10 ft Channel → Rib

Rx = Dike Bx, Lt Gray, Limo Stained More Sulfides, Galena, Sphalerite, Chalcopyrite,

Dike-Lm - Qtz Bx

- mineralization is both finely disseminated sulfides & as dots & pods along fractures & at intersections

- possibly some secondary silicification or qtz flooding associated with mineralization

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 6-8-80 **LJM & A** No. 1117

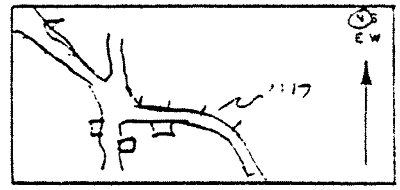
PROJECT Simon Mine

LOCATION 353 Level Main Dr.

20 Ft From 4-13 S T R

SAMPLE TYPE

(ROCK) — circled
SOIL
SEDIMENT
OTHER



SAMPLE DESCRIPTION 10 Ft Channel

Rx = Dike Bx & Qtz Bx, Lt Gray Highly Sil'c Hard w/ Gouge Matrix, Limo Staine, Dis. Sulfide, Galena, Sphalerite Chalcopyrite Along Fract.

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM/JWB

DATE 6/7/80 **LJM & A** No. 1114

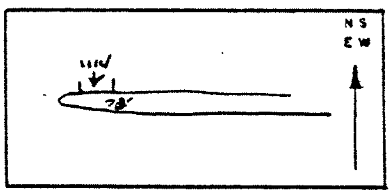
PROJECT Simon Mine

LOCATION SW Adit - N. Rib -

S T R

SAMPLE TYPE

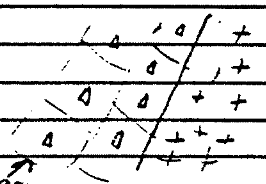
(ROCK) — circled
SOIL
SEDIMENT
OTHER



SAMPLE DESCRIPTION 4ft channel

Rx = LS Bx & gouge + minor dike

- heavy hematite staining on contact



Rx Bx & gouge

heavy hematite zone = 2ft

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER

DATE 6-8-80 **LJM & A** No. 1115

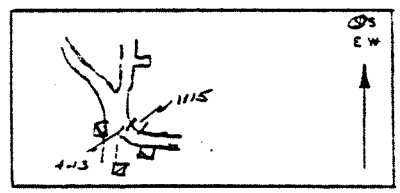
PROJECT Simon Mine

LOCATION 353 Level Main Drift

At 4-13 S T R

SAMPLE TYPE

(ROCK) — circled
SOIL
SEDIMENT
OTHER



SAMPLE DESCRIPTION 10 Ft Channel - Rib

Rx = Dike & Dike Bx, Lt Gray, w/ Galena, Sphalerite, Chalcopyrite — Sample Cutting Across General Old Stope Trend, 10-15% Sulfides, Very Hard, Some Limo Staining W/...

ASSAYED FOR: Au Ag Cu Pb Zn OTHER

SAMPLER LJM/JWB

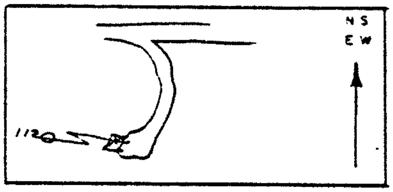
DATE 6-8-80 **LJM & A** No. 1120

PROJECT Simon Mine

LOCATION 353 Level Xcut S

S T R

SAMPLE TYPE (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION Muck Pile Grab
Rx = Dike & Dike Bx Showing
Some Gal & Sph

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

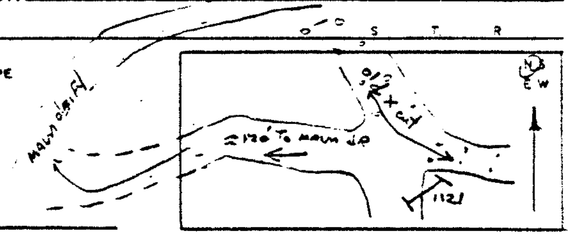
DATE 6/8/80 **LJM & A** No. 1121

PROJECT Simon Mine

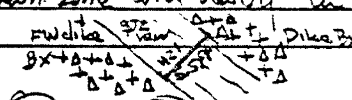
LOCATION 353 Level - old x-cut

S T R

SAMPLE TYPE (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 5.5 ft Rib/channel across N-dipping (≈45°) qtz vein
- Rx = broken/w. gouge - qtz vein (fissure filling?) heavily oxidized
- Mineralization - ga, cp, CuSO4, py, Blk sph (w. little)
- oxidation is predominantly limonite & Cu salts
- Rx - also contains thin (<.5ft) gouge zones parallel to vein zone with heavy Cu salts (HS 1121)



ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

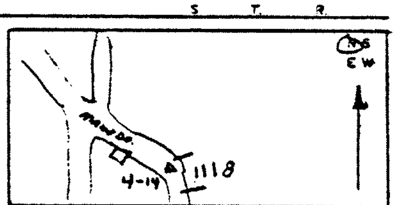
DATE 6/8/80 **LJM & A** No. 1118

PROJECT Simon Mine

LOCATION 353 Level - Main drift from DH-14 -

S T R

SAMPLE TYPE (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 9ft channel - rib
- Rx = dike bx & gouge with weakly FeOx stained matrix
- Mineralization = ga, sp, cp, py diss. & as fx clots (Total sulphide ≈5+%)
- some Qz in matrix
- Sample is on FW side of small N. dipping fault which has no great effect on mineralization except that FW side is slightly more FeOx'd
- in general - oxidation is minor

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER

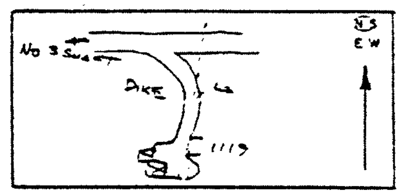
DATE 6-8-80 **LJM & A** No. 1119

PROJECT Simon Mine

LOCATION 353 Level Xcut S.

S T R

SAMPLE TYPE (ROCK) SOIL SEDIMENT OTHER



SAMPLE DESCRIPTION 10 Ft Channel
Rx = Dike, Qtz Bx Near Contact w/ Ls. Contains Both Dike & Ls Frags. 2½ Ft of Massive Gal & Sph & 7½ Ft of Less Min Bx. Very High Grade Looking

ASSAYED FOR: (Au) (Ag) (Cu) (Pb) (Zn) OTHER

SAMPLER LJM/JWB

X-RAY ASSAY LABORATORIES 13-JUL-[illegible] REPORT 7369 REF. FILE 3524-S1 PAGE 1

SAMPLE	AU PPB	CU PPM	CU %	ZN PPM	ZN %
1001	230	140	--	570	--
1002	150	35	--	250	--
1003	<1	190	--	770	--
1004	42	20	--	140	--
1005	990	210	--	1130	0.15
1006	<1	150	--	170	--
1007	140	66	--	320	--
1008	150	45	--	240	--
1009	52	30	--	170	--
1010	92	55	--	290	--
1011	120	31	--	340	--
1012	33	52	--	220	--
1013	210	42	--	240	--
1014	50	22	--	150	--
1015	56	24	--	270	--
1016	56	66	--	360	--
1017	160	43	--	340	--
1018	71	51	--	230	--
1019	81	97	--	270	--
1020	57	310	--	420	--
1021	67	590	--	1550	0.30
1022	74	220	--	600	--
1023	42	240	--	590	--
1024	59	230	--	520	--
1025	14	1060	0.11	650	--
1026	13	960	0.12	1630	0.27
1027	10	2340	0.26	4900	0.57
1028	44	3600	1.02	75000	7.96
1029	13	2180	0.24	26000	2.75
1030	<1	[illegible]	--	7300	0.82
1031	16	460	--	750	--
1032	77	290	--	450	--
1033	140	120	--	300	--
1034	250	30	--	260	--
1035	540	250	--	410	--
1036	110	210	--	1560	0.31
1037	320	560	--	36000	3.72
1038	51	14000	1.57	31000	3.43
1039	100	1300	0.14	14200	1.54
1040	30	85	--	1490	0.19
1041	210	130	--	4300	0.46
1042	12	85	--	270	--
1043	1	150	--	210	--
1044	<1	140	--	[illegible]	--
1045	<1	130	--	[illegible]	--
1046	7	40	--	210	--
1047	5	22	--	240	--
1048	11	47	--	[illegible]	--
1049	17	20	--	[illegible]	--
1050	3	24	--	250	--
1051	[illegible]	20	--	210	--
1052	6	32	--	450	--
1053	14	40	--	410	--
1054	12	[illegible]	--	1330	0.13
1055	34	420	--	600	--

SAMPLE	AG PPM	AG OZ/TON	PB PPM	PB %
1001	19	0.34	2460	0.35
1002	13	5.33	120000	10.3
1003	30	2.33	24900	3.30
1004	16	1.06	3540	1.43
1005	20	3.06	59000	6.13
1006	13	0.49	1350	0.37
1007	33	3.23	16600	3.76
1008	20	5.79	56000	6.49
1009	23	3.21	42000	4.62
1010	17	3.79	63000	7.53
1011	27	2.71	26000	3.99
1012	22	2.16	13000	2.23
1013	15	1.14	5100	1.33
1014	11	0.69	4900	1.77
1015	10	0.47	1450	0.34
1016	24	3.16	60000	7.69
1017	14	2.27	103000	10.3
1018	21	2.59	67000	6.76
1019	27	1.34	54000	6.14
1020	24	2.30	29600	5.73
1021	10	0.87	12600	1.39
1022	32	3.11	42800	4.22
1023	15	1.44	7300	1.91
1024	10	1.05	8200	1.64
1025	6	--	2120	0.39
1026	3	--	1330	0.31
1027	3	--	200	--
1028	3	--	150	--
1029	2	--	220	--
1030	<1	--	210	--
1031	7	--	1260	0.37
1032	12	0.91	4700	1.71
1033	32	1.95	40000	5.43
1034	56	3.38	67000	7.35
1035	34	3.07	43300	5.32
1036	21	2.13	25000	3.33
1037	23	2.40	25000	2.76
1038	6	--	400	--
1039	10	--	2200	0.21
1040	11	0.39	260	--
1041	27	0.31	2730	0.22
1042	<1	--	100	--
1043	<1	--	100	--
1044	<1	--	77	--
1045	<1	--	130	--
1046	<1	--	190	--
1047	<1	--	91	--
1048	<1	--	310	--
1049	<1	--	34	--
1050	<1	--	40	--
1051	<1	--	47	--
1052	<1	--	43	--
1053	<1	--	34	--
1054	3	--	720	--
1055	3	--	150	--

X-RAY ASSAY LABORATORIES 13-JUN-[illegible] REPORT 7360 REF. FILE 3524-51 PAGE 2

SAMPLE	AU PPB	CU PPM	CU %	ZN PPM	ZN %
1056	10	150	--	200	--
1057	1	63	--	130	--
1058	2	58	--	200	--
1059	1	45	--	390	--
1060	3	30	--	210	--
1061	32	78	--	91	--
1062	26	95	--	32200	3.29
1063	12	92	--	240	--
1064	<1	26	--	270	--
PMMG-112	55	--	--	--	--
PMMG-113	20	--	--	--	--
PMMG-559	13	--	--	--	--
PMMG-560	3	--	--	--	--
PMMG-561	42	--	--	--	--
PMMG-562	4	--	--	--	--
PMMG-563	9	--	--	--	--
PMMG-564	5	--	--	--	--
PMMG-565	7	--	--	--	--
PMMG-566	14	--	--	--	--
PMMG-567	14	--	--	--	--
PMMG-568	23	--	--	--	--
PMMG-569	54	--	--	--	--
PMMG-570	55	--	--	--	--
PMMG-571	73	--	--	--	--
PMMG-572	2	--	--	--	--
PMMG-573	1	--	--	--	--
PMMG-574	1	--	--	--	--
PMMG-575	<1	--	--	--	--
PMMG-576	2	--	--	--	--
PMMG-577	2	--	--	--	--
PMMG-578	<1	--	--	--	--
PMMG-579	1	--	--	--	--
PMMG-580	1	--	--	--	--
PMMG-581	3	--	--	--	--
PMMG-582	<1	--	--	--	--
PMMG-583	64	--	--	--	--
PMMG-584	11	--	--	--	--
PMMG-585	2	--	--	--	--
PMMG-586	<1	--	--	--	--
PMMG-587	3	--	--	--	--
PMMG-588	4	--	--	--	--
PMMG-589	2	--	--	--	--
PMMG-590	<1	--	--	--	--
PMMG-591	<1	--	--	--	--
PMMG-592	<1	--	--	--	--
PMMG-593	<1	--	--	--	--
PMMG-594	<1	--	--	--	--
PMMG-595	1	--	--	--	--
PMMG-596	<1	--	--	--	--
PMMG-597	<1	--	--	--	--
PMMG-598	4	--	--	--	--
PMMG-599	14	--	--	--	--
PMMG-600	340	--	--	--	--
PMMG-601	220	--	--	--	--
PMMG-602	120	--	--	--	--
PMMG-603	80	--	--	--	--

SAMPLE	AG PPM	AG OZ/TON	PB PPM	PB %
1056	<1	--	110	--
1057	<1	--	70	--
1058	<1	--	82	--
1059	<1	--	130	--
1060	<1	--	180	--
1061	2	--	75	--
1062	68	2.23	27000	2.52
1063	7	--	1310	0.27
1064	<1	--	130	--
PMMG-112	<1	--	--	--
PMMG-113	<1	--	--	--
PMMG-559	<1	--	--	--
PMMG-560	<1	--	--	--
PMMG-561	<1	--	--	--
PMMG-562	<1	--	--	--
PMMG-563	<1	--	--	--
PMMG-564	<1	--	--	--
PMMG-565	<1	--	--	--
PMMG-566	<1	--	--	--
PMMG-567	<1	--	--	--
PMMG-568	<1	--	--	--
PMMG-569	<1	--	--	--
PMMG-570	<1	--	--	--
PMMG-571	<1	--	--	--
PMMG-572	<1	--	--	--
PMMG-573	<1	--	--	--
PMMG-574	<1	--	--	--
PMMG-575	<1	--	--	--
PMMG-576	<1	--	--	--
PMMG-577	<1	--	--	--
PMMG-578	<1	--	--	--
PMMG-579	<1	--	--	--
PMMG-580	<1	--	--	--
PMMG-581	<1	--	--	--
PMMG-582	<1	--	--	--
PMMG-583	<1	--	--	--
PMMG-584	<1	--	--	--
PMMG-585	<1	--	--	--
PMMG-586	<1	--	--	--
PMMG-587	<1	--	--	--
PMMG-588	<1	--	--	--
PMMG-589	<1	--	--	--
PMMG-590	<1	--	--	--
PMMG-591	<1	--	--	--
PMMG-592	<1	--	--	--
PMMG-593	<1	--	--	--
PMMG-594	<1	--	--	--
PMMG-595	<1	--	--	--
PMMG-596	<1	--	--	--
PMMG-597	<1	--	--	--
PMMG-598	<1	--	--	--
PMMG-599	<1	--	--	--
PMMG-600	<1	--	--	--
PMMG-601	<1	--	--	--
PMMG-602	<1	--	--	--
PMMG-603	<1	--	--	--

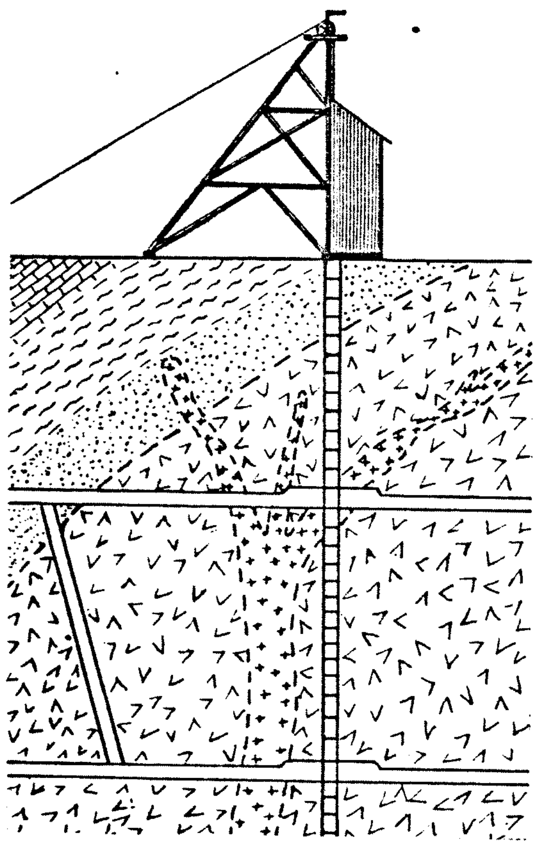
SAMPLE	AG PPM	AG OZ/TON	PB PPM	PB %
1065	5	0.75	10000	1.01
1066	6	0.86	12800	1.12
1067	1	--	720	--
1068	1	--	350	--
1069	1	--	440	--
1070	3	--	1440	--
1071	1	--	480	--
1072	1	--	1560	--
1073	2	--	1600	--
1074	11	2.68	44000	4.16
1075	22	1.24	4800	0.51
MG1-1	<1	--	--	--
MG1-2	<1	--	--	--
MG1-3	<1	--	--	--
MG1-4	<1	--	--	--
MG1-5	<1	--	--	--
MG1-6	<1	--	--	--
MG1-7	<1	--	--	--
MG1-8	<1	--	--	--
MG1-9	<1	--	--	--
MG1-10	<1	--	--	--
MG1-11	1	--	--	--
MG1-12	1	--	--	--
MG1-13	<1	--	--	--
MG1-14	1	--	--	--
MG1-15	<1	--	--	--
MG1-16	<1	--	--	--
MG1-17	1	--	--	--
MG1-18	<1	--	--	--
MG1-19	<1	--	--	--
MG1-20	<1	--	--	--
MG1-21	<1	--	--	--
MG1-22	<1	--	--	--
MG1-23	<1	--	--	--
MG1-24	<1	--	--	--
MG1-25	<1	--	--	--
MG1-26	<1	--	--	--
MG1-27	<1	--	--	--
MG1-28	<1	--	--	--
MG1-29	<1	--	--	--
MG1-30	<1	--	--	--
MG1-31	<1	--	--	--
MG1-32	<1	--	--	--
MG1-33	<1	--	--	--
MG1-34	<1	--	--	--
MG1-35	<1	--	--	--
MG1-36	<1	--	--	--
MG1-37	<1	--	--	--
MG1-38	<1	--	--	--
MG1-39	<1	--	--	--
MG1-40	1	--	--	--
MG1-41	<1	--	--	--
MG1-42	<1	--	--	--
MG1-43	<1	--	--	--
MG1-44	<1	--	--	--

SAMPLE	AU OZ/TON	AU PPB	CU PPM	ZN PPM	ZN %
1065	--	77	150	5000	0.46
1066	--	70	62	5900	0.55
1067	--	16	23	330	--
1068	--	43	20	280	--
1069	--	35	19	350	--
1070	--	41	22	420	--
1071	--	24	36	370	--
1072	--	79	38	400	--
1073	--	41	63	760	--
1074	--	520	940	37200	4.05
1075	--	200	500	16600	1.81
MG1-1	--	3	--	--	--
MG1-2	--	2	--	--	--
MG1-3	--	5	--	--	--
MG1-4	--	3	--	--	--
MG1-5	--	<1	--	--	--
MG1-6	--	<1	--	--	--
MG1-7	--	<1	--	--	--
MG1-8	--	11	--	--	--
MG1-9	--	50	--	--	--
MG1-10	--	86	--	--	--
MG1-11	--	380	--	--	--
MG1-12	--	780	--	--	--
MG1-13	--	140	--	--	--
MG1-14	--	130	--	--	--
MG1-15	--	80	--	--	--
MG1-16	--	74	--	--	--
MG1-17	--	61	--	--	--
MG1-18	--	52	--	--	--
MG1-19	--	67	--	--	--
MG1-20	--	66	--	--	--
MG1-21	--	72	--	--	--
MG1-22	--	79	--	--	--
MG1-23	--	45	--	--	--
MG1-24	--	55	--	--	--
MG1-25	--	14	--	--	--
MG1-26	--	110	--	--	--
MG1-27	--	21	--	--	--
MG1-28	--	11	--	--	--
MG1-29	--	22	--	--	--
MG1-30	--	16	--	--	--
MG1-31	--	26	--	--	--
MG1-32	--	77	--	--	--
MG1-33	--	24	--	--	--
MG1-34	--	70	--	--	--
MG1-35	--	53	--	--	--
MG1-36	--	27	--	--	--
MG1-37	--	18	--	--	--
MG1-38	--	24	--	--	--
MG1-39	--	68	--	--	--
MG1-40	--	470	--	--	--
MG1-41	--	240	--	--	--
MG1-42	--	72	--	--	--
MG1-43	--	18	--	--	--
MG1-44	--	20	--	--	--

SAMPLE	AG PPM	AG OZ/TON	PB PPM	PB %
1076	2	--	120	--
1077	10	0.35	920	0.10
1078	13	0.81	1280	0.14
1079	35	2.77	6000	0.60
1080	39	7.61	104000	10.2
1081	25	0.98	16000	1.41
1082	28	0.92	15600	1.46
1083	9	--	36400	3.15
1084	11	--	29400	2.49
1085	7	--	60000	5.30
1086	8	--	14800	1.35
1087	4	--	1360	0.17
1088	14	0.26	8000	0.79
1089	8	--	44000	3.76
1090	30	2.39	29000	3.25
1091	17	6.81	260000	22.8
1092	8	--	2000	0.24
1093	22	1.56	5000	0.44
1094	17	9.14	45600	3.93
1095	70	5.40	108000	10.3
1096	18	0.91	4400	0.41
1097	29	2.38	10000	3.90
1098	27	2.08	18400	3.08
1099	42	3.03	13200	2.45
1100	18	1.48	4400	0.96
1101	12	0.46	1600	0.26
1102	12	0.20	480	--
1103	21	1.22	10000	1.06
1104	12	0.44	1440	0.15
1105	22	0.79	920	0.05
1106	6	--	400	--
1107	2	--	480	--
1108	30	1.20	15600	1.42
1109	41	1.39	28300	2.26
1110	30	1.22	18400	1.58
1111	20	0.43	12800	1.19
1112	11	0.48	720	0.09
1113	7	--	560	0.08
1114	4	--	560	0.08
1115	27	0.59	10800	1.05
1116	9	--	3200	0.30
1117	9	--	3600	0.32
1118	10	TRACE	3840	0.35
1119	43	1.55	38000	3.38
1120	32	1.38	24000	2.20
1121	34	1.71	7840	0.71
MG-1-81	1	--	--	--
MG-1-82	1	--	--	--
MG-1-83	1	--	--	--
MG-1-84	1	--	--	--
MG-1-85	1	--	--	--
MG-1-86	<1	--	--	--
MG-1-87	<1	--	--	--
MG-1-88	<1	--	--	--
MG-1-89	<1	--	--	--

SAMPLE	AU PPB	CU PPM	CU %	ZN PPM	ZN %
1076	<1	8	--	360	--
1077	6	45	--	6200	0.63
1078	10	230	--	30800	3.45
1079	26	550	0.08	55000	5.36
1080	68	410	--	60000	5.11
1081	17	560	0.08	12900	1.18
1082	5	36	--	7700	0.73
1083	81	1720	0.18	55000	5.04
1084	12	220	--	13200	1.29
1085	62	610	0.07	28200	2.79
1086	110	530	0.07	17600	1.70
1087	<1	35	--	3300	0.35
1088	10	50	--	3390	0.40
1089	135	580	0.08	58000	5.30
1090	33	570	0.09	170000	15.4
1091	98	170	--	27100	2.89
1092	26	110	--	28300	2.76
1093	2	120	--	45000	4.10
1094	120	380	--	15400	1.48
1095	39	290	--	19500	1.89
1096	15	95	--	5300	0.55
1097	165	24600	2.89	31400	3.22
1098	130	19400	2.11	10800	1.10
1099	47	23800	2.57	9200	1.05
1100	43	12800	1.45	5800	0.72
1101	590 .017	1140	0.12	930	--
1102	410	930	0.08	1140	TBR
1103	240	1780	0.17	4200	0.46
1104	240	1160	0.09	1080	0.13
1105	41	2860	0.27	2020	0.20
1106	16	870	0.09	1970	0.20
1107	10	49	--	530	--
1108	175	280	--	11300	0.98
1109	23	140	--	29600	3.04
1110	63	150	--	28300	2.83
1111	19	160	--	17400	1.61
1112	370	120	--	1110	0.09
1113	340	52	--	520	--
1114	210	110	--	320	--
1115	30	39	--	2780	0.31
1116	23	76	--	4300	0.41
1117	28	59	--	2720	0.28
1118	11	41	--	2400	0.24
1119	39	91	--	40000	3.64
1120	20	170	--	19000	1.85
1121	1140 .033	1460	0.12	12500	1.16
MG-1-81	43	--	--	--	--
MG-1-82	52	--	--	--	--
MG-1-83	110	--	--	--	--
MG-1-84	330	--	--	--	--
MG-1-85	100	--	--	--	--
MG-1-86	110	--	--	--	--
MG-1-87	38	--	--	--	--
MG-1-88	43	--	--	--	--
MG-1-89	48	--	--	--	--

REFERENCES



DEPARTMENT OF THE INTERIOR
Albert B. Fall, Secretary

United States Geological Survey
George Otis Smith, Director

Bulletin 725—II

ORE DEPOSITS OF CEDAR MOUNTAIN MINERAL COUNTY, NEVADA

BY

ADOLPH KNOPF

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ORE DEPOSITS OF CEDAR MOUNTAIN, MINERAL COUNTY, NEVADA.

By ADOLPH KNOPF.

SUMMARY.

Cedar Mountain, in western Nevada, contains the Simon silver-lead district, which is the chief center of interest, and the Omco gold district.

In 1919 large bodies of silver-bearing lead-zinc ore were discovered below an immense gossan that had been known since 1879 but had not been thoroughly prospected. A rush to the district took place and the country was staked over a radius of many miles. The area soon became known as the Simon district, from the name of the chief mine. The excitement quickly subsided, however, and by the summer of 1920 work was being done only at two places—the Simon mine, in which a large body of ore had been partly blocked out, and the Simon Contact prospect.

The ore deposits are in the northern part of Cedar Mountain. At Simon the rocks that compose the range are divided by a great transverse fault. North of the fault the range consists wholly of Tertiary rocks, mainly rhyolites and andesites; south of the fault it consists of Triassic rocks which have been intruded by granodiorite and allied dikes.

The oldest rocks—those of Triassic age—are chiefly limestones. The volcanic rocks that occur with them in places were erupted contemporaneously with the deposition of the limestones, like the lavas that occur in the Triassic elsewhere in Nevada. The limestones and associated lavas and tuffs were intruded by granodiorite at the end of the Jurassic or early in the Cretaceous period, and the silver-lead ores appear to have been formed as one of the consequences of that intrusion.

In Tertiary time, after erosion had progressed far enough partly to uncover the granite, volcanic activity set in and large volumes of rhyolite and andesite were erupted. Subsequently, approximately late in Miocene time, a great fresh-water lake was formed wherein were deposited the sandstones, shales, limestones, and other rocks of the Esmeralda formation. These lake beds lie on both flanks of Cedar Mountain and have been somewhat folded and considerably faulted.

The ore deposits of main interest are the silver-bearing lead-zinc bodies at the Simon mine. They consist of galena and zinc blende, commonly inclosed in a gangue of jasperoid, and have resulted from the replacement of the Triassic limestone adjoining an alaskite porphyry dike. These ores appear to be of late Jurassic or early Cretaceous age and to have been formed in connection with the intrusion of the granodiorite and the dikes associated with it.

The gold-bearing deposits are quartz veins inclosed in the Tertiary lavas. The veins are of the well-known distinctive Tertiary type, wherein much of the quartz is pseudomorphic after lamellar calcite. The precious metal—probably the gold-silver alloy electrum—is so finely disseminated throughout the quartz as to be invisible, and sulphides are absent. Thus these veins contrast notably in appearance and content with the lead-silver ores. The principal vein is the Olympic, which has yielded somewhat more than $700,000 in gold and silver.

two small mining camps of Simon and Omco, which ... feet ... the two principal mines—the Simon silver-lead mine and the Olympic gold mine, each of which has its own post office.

The nearest railroad point is Mina, on the Southern Pacific system, 22 miles southwest of Simon. Between Cedar Mountain and the railroad lie the Pilot Mountains, which are crossed by a fairly low pass at an altitude of 6,240 feet; Mina itself is at an altitude of 4,550 feet.

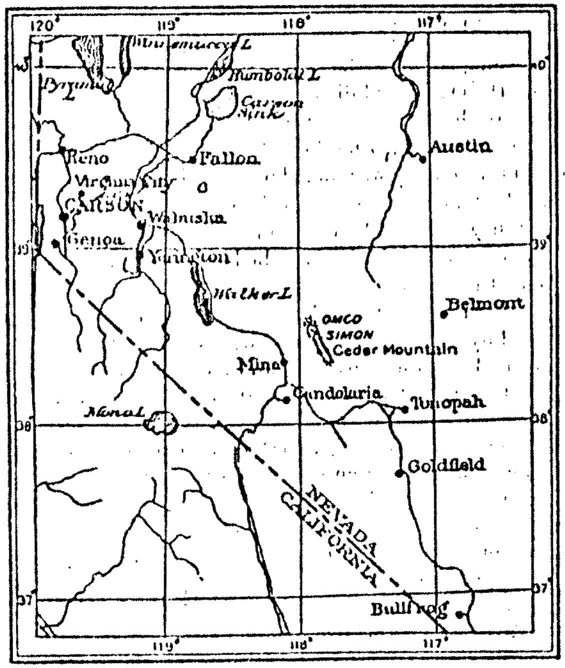


FIGURE 53.—Index map showing the location of Cedar Mountain, Nev.

Cedar Mountain forms a broad, low range of rather subdued relief. It contrasts markedly in this respect with adjacent ranges, especially with the Pilot Mountains, the next range to the west, whose western front exhibits one of the most superb clean-cut triangular-faceted fault scarps that can be seen anywhere in Nevada. The culminating point of Cedar Mountain is Little Pilot Peak, whose elevation is 8,046 feet. Simon is at 6,700 feet and Omco (the post office of the Olympic mine) at 6,000 feet. The topography of the region is shown on the Tonopah map of the United States Geological Survey.

ACKNOWLEDGMENTS.

It is a pleasant duty to acknowledge here the many courtesies extended by Mr. Robert J. Bonnemort, of the Olympic mine, and Messrs. T. P. McNamara and E. W. King, of the Simon mine, and to recall their interest in and appreciation of the work of the geologists of the Federal Survey. In the field work on which the present report is based I was assisted by my wife, Eleanora Bliss Knopf, of the United States Geological Survey.

Limestone is the predominant rock in the part of Cedar Mountain near the Simon mine. It is a dark-gray fine-grained rock, except where it has been recrystallized as a result of granitic intrusions. This alteration is specially prominent on Little Pilot Mountain, where the limestone has been transformed to a coarse white marble.

In general it is difficult to detect bedding in the limestone. The dip west of the Simon mine is 45° W., but some distance east of the mine the dip is eastward, so that the major fold in the limestone is a broad anticline. On account of the prevalence of faulting and of the internal deformation to which the limestone has been subjected the thickness could not be measured.

Fossils found in the limestone establish its age as Middle Triassic. T. W. Stanton, to whom they were submitted for identification, reports as follows:

The following report is submitted on a small collection of invertebrate fossils from the Simon district, Cedar Mountain, Nev., referred to in Mr. Adolph Knopf's letter of August 20, 1920:

Lot 1. Collected along pipe line to Wild Rose Spring, 2 miles from Simon mine.
- Spiriferina? sp.
- Daonella moussoni Merian.
- Nucula sp.
- Ceratites (Gymnotoceras) beckeri Smith?
- Ceratites (Gymnotoceras) russelli Smith?

This lot is assigned without question to the Middle Triassic.

Lot 2. 100 feet in the footwall of the Simon lode, near the Mammoth fault.
- Spiriferina? sp. Fragment.

This specimen is not sufficient for determining whether the rock is Triassic or older.

Lot 3. Footwall of Simon lode. Faulted west segment, summit of hill southwest of main shaft.

This fragment of rock contains imperfect specimens of two or more pelecypods and possibly a brachiopod which may be of Triassic age or older.

SIMON QUARTZ KERATOPHYRE.

The name Simon quartz keratophyre is here applied to a series of lavas and breccias that occur in the immediate vicinity of the Simon mine. The lavas are crowded with numerous large crystals of quartz and feldspar and contain a little chloritized biotite. Under the microscope the phenocrysts are seen to be inclosed in an exceedingly cryptocrystalline groundmass, which is clearly a devitrified glass and in the more marked examples has a pronounced flowage structure that swirls around the porphyritic crystals. As the feldspars all prove to be albite ($Ab_{95}An_5$), these lavas are termed quartz kerato-

[illegible] tuff [illegible] lavas themselves, and in practice it is difficult to discriminate them surely enough for geologic mapping. Some of the rocks contain numerous angular bits of limestone and chert (or felsite?) and are probably flow breccias. A coarse breccia, which is well exposed on the 500-foot level of the Simon mine (at survey plug 519), shows numerous inclusions of argillite that range from sharply angular to nicely rounded; it is doubtless an explosion breccia—that is, a breccia formed from fragments blown out from a volcanic vent.

Some quartz monzonite porphyry is intrusive into the quartz keratophyres northwest of the Simon Contact prospect. In the field the porphyry resembles the keratophyres rather closely, the main difference being that it contains a far smaller number of phenocrysts; but under the microscope more marked differences become apparent, as is shown on page 366, where these intrusives are described in some detail.

The structural relations of the Simon quartz keratophyre are obscure, for the difficulty of distinguishing the intercalated beds of tuff nullified attempts to determine the strike and dip. In general the quartz keratophyre is faulted against the adjacent rocks.

The age of these rocks is probably Triassic, and they are believed to have been erupted at about the time the limestones of the range were being deposited. The evidence for thus dating the age of the Simon quartz keratophyre is not entirely conclusive, however, for it rests in part on the fact that some of the ore of the Simon mine is inclosed in the quartz keratophyre, and this ore, as discussed on page 373, is regarded as of pre-Tertiary age. The Triassic was a time of intense volcanic activity in Nevada, and keratophyres, together with andesites and dacites, are abundantly represented in the Triassic section of the Yerington district,[1] which is the nearest district whose geologic details are known. Some of the felsitic volcanic rocks of Cedar Mountain are clearly older than the granodiorite intrusion, as they are cut by innumerable dikelets of aplite and are highly metamorphosed by them. Further, the Simon quartz keratophyre is cut by porphyries that appear to be related to the granodiorite intrusion. In short, all the available evidence points in the same direction and indicates that the Simon quartz keratophyre is Triassic.

[1] Knopf, Adolph, Geology and ore deposits of the Yerington district, Nev.: U. S. Geol. Survey Prof. Paper 114, pp. 13-15, 1918.

[illegible] of granitic rock occur in Cedar Mountain, and the margin of one of these lies but a few hundred yards south of the Simon mine. This mass extends southward toward Little Pilot Peak—the summit of which, however, consists of a capping of marbleized limestone—and extends down on the east flank of the range, forming a broad area of subdued relief, in contrast to the bold topography of the encircling limestone. Like many other ranges of Nevada, Cedar Mountain is underlain by a core of granite.

The granitic rock is a moderately coarse grained aggregate of feldspar, quartz, biotite, and hornblende. The feldspar proves under the microscope to be chiefly plagioclase of marked zonal growth, ranging from a core of $Ab_{50}An_{50}$ to an outermost zone of $Ab_{80}An_{20}$, as a whole averaging $Ab_{65}An_{35}$, and as orthoclase is only a minor component the rock falls into the group of granodiorites.

The intrusive nature of the granodiorite is clearly shown. Near the contacts the granodiorite is porphyritic, and tongues and dikes of this facies penetrate the adjacent limestone. Further, the limestone has been marbleized, and small bodies of garnet rock have been formed locally. In addition, aplite, lamprophyre, and diorite porphyry dikes occur in and around the margins of the granodiorite.

As the granodiorite has invaded the Triassic limestones it is clearly of post-Triassic age. Presumably it was intruded at the end of Jurassic time or early in the Cretaceous, like the granitic rocks of the Sierra Nevada not far west.

ALLIED DIKE ROCKS.

Aplite forms dikes in the granodiorite and adjacent limestone. Some of the dikes are less than an inch thick and are so fine grained as to be nearly aphanitic; others are several feet thick and of coarse grain, verging toward alaskite. A large mass of aplite, hundreds of feet in diameter, occurs on the margin of the granodiorite mass where that body crops out nearest the Simon mine. It has intruded and metamorphosed Triassic felsites, so that they closely resemble the aplite itself.

Narrow dikes of hornblende lamprophyre cut the granodiorite and the surrounding limestone as well, but they appear to be more common in the granodiorite. They are dark, heavy rocks, so fine grained that the component minerals are not distinguishable by the unaided eye. Under the microscope they are seen to be composed largely of hornblende in innumerable slender prisms between which lies orthoclase. Apatite is noteworthy because of its relative abundance.

Epidote is common as a secondary mineral. The lamprophyre therefore proves to be a vogesite.

Diorite porphyry and granodiorite porphyry dikes occur in the granodiorite and limestone. They are fresh-looking rocks, conspicuously porphyritic through the presence of numerous crystals of plagioclase—more than half the bulk of the rock. Some of these porphyries contain in addition hornblende, whereas others contain chiefly biotite as the dark mineral. The dike on the east flank of the peak marked by mineral monument No. 301 is a typical granodiorite porphyry that carries phenocrysts of plagioclase (dominant), microperthite, quartz, biotite, and hornblende in a microgranular groundmass of orthoclase and quartz. It is identical with the marginal facies of the granodiorite itself. Dikes of this kind are obviously related to that intrusion.

Other dikes, however, whose origin is not so clear are common in the limestone. They are monzonite porphyries somewhat altered and apparently devoid of dark minerals. They are of interest because they occur nearer the Simon mine than the dikes previously mentioned; in fact, quartz monzonite porphyry occurs in the Simon quartz keratophyre. These dikes may well be contemporaneous with the others, but they have become altered by mineralizing solutions, and the pyrite introduced by those solutions has been oxidized, so that the difference may be more apparent than real.

A dike of this kind is well shown 400 feet west of the northwest end of the Simon lode. It trends parallel to the bedding of the limestone and is possibly 45 feet thick. It is characterized by numerous porphyritic feldspar crystals that average half an inch in length. Quartz phenocrysts, though present, are exceedingly rare. On close inspection it is seen that many of the feldspar phenocrysts contain minute incomplete rosettes of tourmaline, showing that the dike has been altered, most probably by gases that escaped at high temperature from the granodiorite while it was consolidating. The microscope shows that the porphyritic feldspars are orthoclase and oligoclase, indicating that the rock is a monzonite porphyry, or, if we take into account the sporadic quartz phenocrysts, a quartz monzonite porphyry. A similar dike—not tourmalinized, however—occurs 200 feet east of the Simon Contact prospect, and similar rock, except that quartz phenocrysts are more common, occurs in the quartz keratophyre northwest of that prospect. An interesting minor petrographic feature of these dikes is that their common origin, their consanguinity, is indicated by their content of pleochroic apatite.

TERTIARY VOLCANIC ROCKS.

GENERAL FEATURES.

Between the time when the older rocks described in the preceding pages were formed and the time when the next younger group of rocks, which consisted chiefly of lavas, were erupted erosion laid bare the granodiorite. As the lavas are overlain unconformably by the lake beds of the Esmeralda formation, of approximately late Miocene age, they must have been erupted during the earlier part of Tertiary time. They are probably not younger than middle Miocene, as suggested by Buwalda.[3]

The Tertiary volcanic rocks form a prominent element in the geology of Cedar Mountain; in fact, the part of the mountain that extends from Simon northward to the Olympic mine consists wholly of these rocks. They are of various types, are much faulted, and evidently are the records of an eventful eruptive and tectonic history, which may not be read by the methods of rapid reconnaissance survey. The detailed studies in recent years of Tonopah, Goldfield, and Yerington show what a complex history may be concealed within an apparently simple accumulation of volcanic rocks. A beginning has been made here in determining the Tertiary volcanic history of Cedar Mountain by the study of the sections at Simon and Omco, but to tie these two sections together would have required an equally detailed examination of the intervening area.

SECTION AT SIMON.

MAMMOTH ANDESITE.

The oldest Tertiary volcanic rock at Simon is the Mammoth andesite, so named because it is well exposed on the Mammoth claim. It is a dull grayish-green porphyritic rock that contains innumerable small tabular phenocrysts of plagioclase. Many of these phenocrysts are honeycombed with inclusions of glass. In places the andesite shows an imperfect columnar structure. Under the microscope the feldspar phenocrysts prove to be sodic labradorite, some hornblende becomes apparent, and a crystal or two of augite is seen. The groundmass is a glass containing microlites of feldspar.

The Mammoth andesite is of uniform character and appears to represent a single flow of lava. Its base was nowhere seen, as the andesite has been faulted down against the older rocks (the Triassic limestone and Simon quartz keratophyre), as shown in figure 54. This fault, which thus forms the lower limit of the Tertiary rocks, strikes transversely to the course of Cedar Mountain and is one of

[3] Buwalda, J. P., Tertiary mammal beds of Stewart and Ione valleys in west-central Nevada: California Univ. Dept. Geology Bull., vol. 8, p. 341, 1914.

the master faults of the region; north of it only Tertiary rocks occur, whereas south of it only Mesozoic rocks occur.

KERATOPHYRE.

A lava of chalk-white color, brilliantly conspicuous in the glare of the desert sun, is the most prominent of the Tertiary volcanics in the vicinity of the Simon mine. It is well exposed on the north side of the main road and extends far to the west of the mine.

This lava overlies the Mammoth andesite and is roughly 200 feet thick. It is an aphanitic white rock devoid of dark minerals. In places it is pitted with irregular gas cavities, now drusy from coatings of minute quartz crystals. Small phenocrysts of glassy striated feldspar are common but are inconspicuous. Spherulites occur irregularly throughout the flow and are especially noticeable in its basal part. Under the microscope this facies is seen to contain many phenocrysts of albite ($Ab_{92}An_8$) in a groundmass that is composed partly of spherulites and partly of devitrified glass, with marked

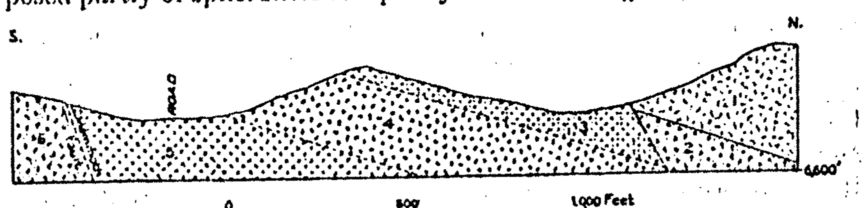


FIGURE 54.—Section across the Tertiary rocks at the Simon mine, Nev. 1, Quartz latite; 2, dacite tuff; 3, pyroxene andesite; 4, keratophyre; 5, Mammoth andesite; 6, Simon quartz keratophyre (Triassic).

flow structure around the phenocrysts. Thin sections from other parts of the flow show the same prevalence of albite phenocrysts throughout the flow; also a few plates of biotite are found, thoroughly bleached. Because of these albite phenocrysts the rock is here termed a keratophyre. A like rock has not heretofore been discovered among the Tertiary lavas of Nevada.

Locally it has been thought that this keratophyre is the extension of the alaskite porphyry dike alongside of which the ore bodies of the Simon mine have formed, but the geologic relations of the keratophyre flow and the dike are alone sufficient to refute this supposition, and the microscope demonstrates that the two rocks, despite a certain superficial resemblance, are petrographically totally unlike.

PYROXENE ANDESITE.

Andesite overlies the keratophyre and forms the summit of the ridge on which the Sterling shaft was sunk. On the north it is cut off by a master fault which dips 60° N., as shown in figure 54, so that its thickness is not known.

This andesite is spotted with numerous plagioclase feldspar phenocrysts, notably larger and more abundant than those in the Mammoth andesite, and, in addition, it shows a considerable quantity of dark minerals in small particles. As a rule the andesite is much altered; the freshest appearing rock, such as that from the Sterling shaft, has a purplish cast. Under the microscope it is seen to be a pyroxene andesite that contains much secondary calcite and chlorite.

DACITE TUFF.

The next youngest volcanic rock is a dacite tuff, which resembles a white porphyritic rhyolite. It is faulted down against the pyroxene andesite and is overlain by a thick sheet of quartz latite. It exceeds 75 feet in thickness.

Under the microscope the tuff is seen to be composed of numerous crystal fragments of labradorite ($Ab_{46}An_{54}$), quartz, and biotite, with sporadic hornblende, set in a compact matrix of minute shards of glass. The texture is typically vitroclastic. The glass matrix, which carries easily visible particles of feldspar, quartz, and biotite, causes the tuff closely to simulate a porphyritic lava to the unaided eye.

QUARTZ LATITE.

Quartz latite is the most abundant of the Tertiary volcanic rocks and forms a thick sheet that underlies the dissected plateau extending from the Simon mine northward to the Olympic mine. It is more than 200 feet thick and rests upon the dacite tuff, there being commonly several feet, in places as much as 20 feet, of dark porphyritic glass at the base of the quartz latite.

The quartz latite is a gray, highly porphyritic lava rich in biotite; it weathers characteristically to a brownish red. It proves under the microscope to be ideally fresh and shows phenocrysts of oligoclase ($Ab_{70}An_{30}$) and sanidine (these two feldspars being present in equal amounts), quartz, and biotite, with a prism or two of hornblende. The groundmass is seen to be largely made up of glass, which has a marked fluxional structure and in places is spherulitic. Such a lava would generally be termed a rhyolite in the field, but, as shown by the description, it is intermediate between a rhyolite and a dacite, and in order to indicate this character it is called a quartz latite. It contrasts with the rhyolites at the Olympic mine, which are strictly sanidine-bearing rhyolites that contain no plagioclase feldspar.

ESMERALDA FORMATION.

A formation consisting of well-bedded sandstones, shales, limestones, and tuffs laid down in a fresh-water lake extends upward on both flanks of Cedar Mountain and encircles its northern end. Its distribution in the surrounding region has been studied by Buwalda, who has carefully described its general features and shown it to be a part of the Esmeralda formation.[3] His collections of mammal remains from the shore deposits of the ancient lake and from the terrestrial strata intercalated in the general sequence of lake beds have been shown by Merriam[4] to be approximately of late Miocene age.

No special examination of the lake beds was made during the present field work, as the formation is younger than the ore deposits of the region. One fact that appears to have escaped earlier notice is that the lake beds wherever seen, both at the Olympic mine and west of Simon, are faulted against the older rocks and in places let down into them in fault troughs. The evidence of faulting is generally poor or obscure in surface exposures because of the loose, unconsolidated condition of the lake beds, but is impressively shown in the underground workings of the Olympic mine.

ORE DEPOSITS.

SILVER-LEAD LODES.

GENERAL CHARACTER AND OCCURRENCE.

The main ore bodies of the district are replacement deposits in limestone. The ore minerals are galena and zinc blende, which are inclosed in a dark-gray fine-grained aggregate of quartz, a jasperoid, as it is termed, that has resulted from the replacement of the limestone by quartz. Pyrite and arsenopyrite are subordinate metallic minerals, and calcite and limestone occur as gangue materials. The relative proportions of these several constituents differ considerably from place to place, but much of the ore consists largely of galena and sphalerite.

The only notable bodies of ore so far found in the district are those in the Simon mine, where two large irregular chimney-like shoots have been developed. It is said that 500,000 tons of ore, averaging 8 per cent of lead, 9 per cent of zinc, and 5 ounces of silver to the ton, is indicated by the work so far done.

The outstanding geologic feature of the Simon mine is that the two ore shoots so far found are localized along an alaskite porphyry dike. This dike averages 30 feet in thickness, has been injected along the contact of the Simon quartz keratophyre and the Triassic limestone, and dips 70° NE. The contact along which it has been injected appears to be a reverse fault, for the limestone, whose strike is parallel to that of the dike, dips 60° SW. near the dike but flattens away from the dike. Petrographically the dike is an aphanitic

[3] Buwalda, J. P., op. cit., pp. 335-363.

[4] Buwalda, J. P., op. cit., p. 350. Also see Merriam, J. C., Tertiary vertebrate fauna from the Cedar Mountain region of western Nevada: California Univ. Dept. Geology Bull., vol. 9, pp. 162-172, 1916.

white rock that carries scattered small phenocrysts of quartz, which is its only conspicuous constituent, and inconspicuous phenocrysts of orthoclase. Under the microscope the phenocrysts of quartz and orthoclase (orthoclase, not sanidine, as the potassium feldspars in the rhyolites of the district invariably prove to be) are seen to be set in a microgranular groundmass of orthoclase and quartz. Locally this rock has been called both rhyolite and granite porphyry, but because it is barren of any dark minerals it will be here termed alaskite porphyry, which is the variety of granite porphyry that is devoid of dark minerals. It doubtless represents a part of the aplitic differentiate of the granodiorite that was injected further

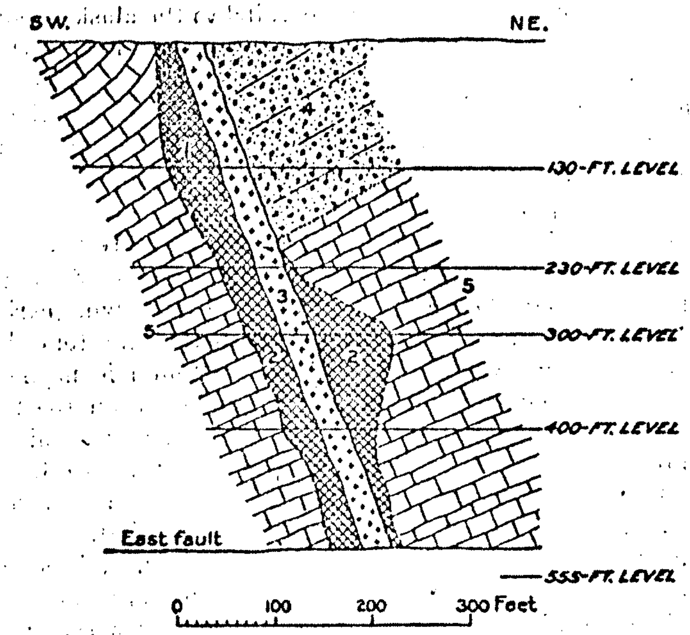


FIGURE 55.—Diagrammatic section through the Simon mine, Nev. 1, Gossan; 2, sulphide ore; 3, alaskite porphyry; 4, Simon quartz keratophyre; 5, Triassic limestone.

from the parent mass and therefore into a colder environment, where it cooled faster and consequently took on a porphyritic-aphanitic texture.

The geologic conditions at the Simon mine are epitomized in figure 55. The ore shoot in the footwall of the dike was discovered first, as it cropped out at the surface. Above the 230-foot level this shoot is composed largely of siliceous gossan, though it contains some galena and cerusite and in places considerable plumbojarosite (a basic sulphate of ferric iron and lead), recognizable by its silky luster and talclike smoothness to the touch. The hanging-wall ore shoot does not extend to the surface, as the keratophyres, which form the hanging wall of the dike near the surface, were evidently not easily replaceable by the ore-forming solutions, as was the limestone.

The contacts of the dike are sheared and reduced to gouge in places; evidently the old fault continued to be a locus of movement. The dike rock has been thoroughly altered by the ascending ore solutions, and it has been silicified, sericitized, and calcitized. Some sulphides also have been introduced, and some quartz veins occur in the porphyry, but the dike has not been highly enough metallized anywhere to constitute ore. The keratophyre that forms the hanging wall of the dike on the upper levels has been similarly altered, and arsenopyrite is relatively common in it, but no ore has formed in it.

A belt of calcium silicate rock lies parallel to the alaskite porphyry dike on the summit of the ridge west of the shaft. It is in the limestone about 100 feet from the dike on the footwall side and comprises both light-colored and dark aphanitic varieties. Under the microscope these rocks are seen to consist of garnet, diopside, actinolite, and calcite. Evidently these rocks represent the outer edge of the contact-metamorphic aureole of the granodiorite intrusion.

One of the problems connected with the Simon ore body is what has become of all the zinc that has been leached out of the gossan. This zinc should have been deposited as smithsonite (zinc carbonate) in the footwall of the lode by reaction with the limestone, but the quantity of secondary zinc minerals so far found is negligible: a little calamine occurs in vugs in the sulphide ore on the 230-foot level, and a small amount of typical iron-stained fine-grained zinc carbonate has been noted in the limestone on that level. Nevertheless the possibility that large bodies of such secondary zinc carbonate should occur ought to be kept steadily in mind.

Of mineralogic interest is the occurrence of adamite in aggregates of small white crystals that line the vugs in the smithsonite. I am indebted to Prof. W. E. Ford, of Yale University, for the identification of this mineral, which is a zinc arsenate—$Zn_3As_2O_8.Zn(OH)_2$,—and which has not previously been recorded as occurring in the United States.

ORIGIN.

The contacts of the alaskite porphyry dike served as the pathways of hot ascending metalliferous solutions, which attacked the limestone and dissolved it and simultaneously deposited in the spaces thus made galena, sphalerite, pyrite, and quartz. The solutions also attacked the alaskite porphyry and converted it into an aggregate of quartz, sericite, calcite, and disseminated sulphides. Thus far we are on firm ground, but when we attempt to link up the origin of the ore-forming solutions with a particular period of igneous activity in the district the evidence becomes less secure. The balance of the evidence, however, strongly favors the hypothesis that the ore-forming solutions were one of the postintrusive effects of the granodiorite. Obviously there have been two widely different kinds of mineralization in the district—one that produced the silver-lead ore and the other the gold-quartz ore, which is of a very marked individuality and is known to be of Tertiary age. These differences in kind strongly suggest differences in age, and, furthermore, to assign the silver-lead ores—the heavy basic ores—to an epi-Jurassic age instead of to the Tertiary age of the gold-quartz ores conforms best with the metallogenic history of Nevada.

MINES AND PROSPECTS.

SIMON MINE.

GENERAL FEATURES.

The chief ore bodies in the district are those in the Simon mine, which is owned by the Simon Silver-Lead Mines Co. The company owns the Mammoth, Lillian, Lillian No. 1, and Lillian No. 2 claims. The Mammoth lode, in which the chief ore bodies occur, was discovered as long ago as 1879, for it crops out as a huge ledge that projects 20 feet or more above the ground. A large amount of leached siliceous gossan occurs, and from this material some oxidized lead was shipped, but the possibilities of the mine remained undisclosed for nearly 40 years. Until recently the mine was known as the Nevada mine. In 1916 it came under the control of P. A. Simon, and exploratory work in depth began to be pushed. In 1919 it became evident that a valuable ore body underlies the gossan, and subsequent exploratory work has revealed another large ore body, which, unlike the other, never extended to the surface, owing to the geologic conditions that governed its formation.

The ore of the Simon mine is closely associated with an alaskite porphyry dike that dips 70° NE., which has been intruded along a reverse-fault contact between the Triassic limestone and the Simon quartz keratophyre. On the upper levels of the mine the quartz keratophyre forms the hanging wall of the dike and the limestone forms the footwall, but below the 230-foot level limestone forms both walls. The main body of ore occurs as a pipelike shoot in the footwall of the dike, but in the lower levels another shoot occurs on the hanging-wall side of the dike. The ore is an argentiferous lead-zinc jasperoid, which has resulted from the replacement of the limestone adjacent to the alaskite porphyry dike.

The mine is developed by a shaft which is vertical down to the sixth level, at 400 feet depth, but below that level it inclines steeply northeastward down to the seventh or bottom level. The bottom level is at a depth of 555 feet, but it is sometimes referred to as the

700-foot level. The largest amount of development work has been done on the fifth, sixth, and seventh levels. The mine makes considerable water on the two lower levels. In figure 55, which shows diagrammatically the main geologic features of the mine, the levels are indicated according to their vertical distances below the collar of the shaft. The outlines of the ore bodies between the levels are drawn in dotted lines to indicate that the exploratory work is not yet full enough to show precisely the location of the boundaries of the irregular ore bodies. Similarly, information is lacking as to the precise position of the floor on which the quartz keratophyre lavas rest.

Early in 1921 a milling plant was built at the mine and a flotation unit installed which is capable of treating from 150 to 175 tons a day. It is planned to add another unit as soon as the plant is running smoothly and satisfactorily. Late in the year a power line built by Mineral County from Hawthorne to the Simon district was completed.

DETAILS OF THE GEOLOGY.

The prominent outcrop that naturally attracted attention early in the history of the district consists of silicified alaskite porphyry, the surface exposure of the dike along which the ore bodies of the Simon mine are localized. Adjoining this alaskite porphyry on the northeast side is the outcrop of the lode proper—leached siliceous vein stuff, in places containing sufficient iron oxide to be termed gossan. This gossan continues down to the 230-foot level, where the sulphide ore from which it was derived appears. In places the gossan carries cerusite, and the richer material of this kind was stoped and shipped by the former operators. Locally the rare mineral plumbojarosite occurs in unusually large and solid masses, and it probably formed part of the ore shipped.

The alaskite porphyry dike, which is so important a feature in the geology of the mine, ranges from 15 to 35 feet in width. It has been considerably altered by the primary mineralizing solutions, which have silicified it so thoroughly that the quartz phenocrysts are now the only recognizable traces of its igneous origin. In addition to the newly introduced quartz, some sericite and calcite were formed in the dike, as well as the sulphides sphalerite, pyrite, galena, and arsenopyrite, but these sulphides are nowhere abundant enough in the dike to constitute ore. In the upper levels of the mine the hanging wall of the dike consists of Simon quartz keratophyre and the footwall consists of limestone; but in the lower levels both walls consist of limestone, as shown in figure 55. Because both the alaskite porphyry and the quartz keratophyre have been altered by mineralization it is difficult to distinguish them. The alaskite porphyry, however, is notably white, brittle, and shattered and tends

to break into small angular fragments; the quartz keratophyre is far more massive, is characteristically permeated with innumerable manganese dendrites, and is much richer in phenocrysts, of which those of quartz are larger and the feldspars are closely crowded.

Unoxidized ore carrying zinc blende and pyrite appears first on the 230-foot level, although more or less galena persists up to the surface. The typical ore consists of galena and deep-brown zinc blende in a gangue of dark-gray jasperoid, with pyrite as a subordinate constituent. The jasperoid has the usual appearance of the fine-grained quartz aggregate that results from the siliceous replacement of limestone.

The ore body first discovered occurs in the footwall of the dike and forms a shoot in places as much as 60 feet wide and more than 200 feet long, making an irregular chimney that pitches northwest. After this shoot had been extensively developed crosscuts driven through the dike disclosed another fine body of ore on the hanging wall of the dike, replacing the limestone that occurs below the keratophyres, which evidently were unfavorable for the deposition of ore. On the 300-foot level this new shoot attains a width of 80 feet. It is reported that the quantity of ore blocked out in the two shoots aggregates 500,000 tons. Ore on the 230-foot level is reported to average 4½ per cent of lead, 9 per cent of zinc, and $2 in silver and gold to the ton.

The ore zone is cut by faults. The largest of these faults is known as the West fault, because it cuts off the northwestward extension of the ore zone on the upper levels. It is shown on the surface, where it trends northward, making an angle of about 35° with the course of the alaskite porphyry dike, which it has displaced 300 feet. The fault has been cut underground, where the trend of the broad corrugations in the walls indicates that the movement on the fault surface had no lateral component. If this is true the total slip is probably 600 to 700 feet. In conformity with this large slip the Simon quartz keratophyre forms the west wall of the fault as far down at least as the sixth (400-foot) level, much farther down than its normal position elsewhere in the mine. Owing to this fault and to the northwestward pitch of the ore shoot, it is probable, as Mr. O. H. Hershey has pointed out to me, that the downward extension of the ore shoot will be found in the west segment of the ore zone west of the West fault.

A fault known as the East fault cuts the ore zone a few hundred feet southeast of the shaft on the upper levels. It strikes at right angles to the ore zone and dips 60° NW. Because of this northwestward dip it comes successively nearer and nearer the shaft on the lower levels and cuts it between the sixth and seventh (bottom) levels. This fault seemingly terminates the alaskite porphyry dike and the ore shoots along the line of the section shown in figure 55, which is drawn through the shaft and at right angles to the ore zone. The displacement on this fault is small, however, the offset being not over 20 feet, and the ore shoot between the East and West faults has been found on the bottom level. After this segment had been cut further exploratory work was stopped late in 1920, and the energies of the company were turned to the construction of a milling plant.

SIMON CONTACT PROSPECT.

The Simon Contact prospect, owned by the Simon Contact Mines Co., is a few hundred yards northeast of the Simon mine. It is developed by an inclined shaft 350 feet long, which slopes 56° NW. and from the bottom of which a level has been driven for several hundred feet southwestward along the footwall of an alaskite porphyry dike.

The prevailing country rock is limestone of Triassic age, as shown by some *Ceratites* and *Spiriferina* that were found in it. This limestone strikes N. 65° W. and dips 20°–45° SW. It is cut by an alaskite porphyry dike, which is the easterly extension of the same dike on which the Simon mine is developed. In this prospect the dike strikes northeast, dips 50° NW., and is 25 feet thick. The Simon quartz keratophyre appears 200 feet west of the shaft, where it has been faulted down against the limestone. This faulting, however, antedates the injection of the alaskite porphyry dike, which cuts across the contact without offset.

The exploratory work has been done mainly along the footwall contact of the dike on the lowest level. Both the limestone and the alaskite porphyry have been heavily shattered and reduced to gouge along this contact. The alaskite porphyry has obviously been much sericitized, and the microscope shows that calcite also has been introduced. Some slabs of heavy sulphide ore occur in the limestone in the footwall of the dike beyond survey plug 311. The ore minerals are chiefly black zinc blende and galena, with pyrite, arsenopyrite, and chalcopyrite subordinate; the only gangue mineral is calcite.

SIMON STERLING PROSPECT.

The Simon Sterling prospect is a few hundred yards north of the Simon mine. It is developed by an incline of 20° that is sunk on the vein. The vein lies in a sheeted zone on the Simon quartz keratophyre, which appears here to be an explosion breccia rather than lava rock. The vein ranges in thickness from a few inches to 2 feet. It carries silver ore, whose tenor is spotty and reaches a maximum of 90 ounces to the ton. The metallic minerals are galena, arsenopyrite, pyrite, sphalerite, and minor chalcopyrite.

FAGAN PROSPECT.

The Fagan prospect, owned by the Simon Fagan Mines Co., is 5 miles in an air line southwest of the Simon mine. It is on the edge of the west flank of Cedar Mountain. The country rock is a fine-grained white marble, which is intruded a few hundred feet east of the shaft by granodiorite porphyry.

In 1920 a vertical shaft had attained a depth of 190 feet, from which crosscuts had been driven on the 50 and 100 foot levels. The vein is vertical and is irregular in width and on the 100-foot level has pinched down to a few inches. In places there is a highly sericitic gouge, possibly derived from the hydrothermal alteration of some intrusive igneous rock. The ore is chiefly limonite that carries lead carbonate; it probably averages between 5 and 10 per cent of lead and contains an ounce of silver for each per cent of lead. The best assay was obtained at a depth of 35 feet, where across a width of 4.9 feet the ore carried 26 per cent of lead, with 34 ounces of silver and 0.36 ounce of gold to the ton.

GOLD VEINS.

GENERAL FEATURES.

The gold veins occur only in the Tertiary volcanic rocks. They are not numerous, and only two have been worked; the Olympic has produced by far the most gold. The ore consists of fine-grained white quartz, much of it clearly pseudomorphic after platy calcite, containing the precious metal—a gold-silver alloy, so finely divided as to be invisible. Pyrite in traces is the only sulphide present, so that these highly siliceous ores contrast notably with the heavy lead-zinc ores of the earlier period of mineralization in the region.

The Olympic mine presents a number of perplexing problems in structure and faulting, the solution of which is vital to the future of the mine. These problems are discussed in the following description, and a solution is indicated.

THE MINES.

OLYMPIC MINE.

GENERAL FEATURES.

The Olympic mine, owned by the Olympic Mines Co., is at the north end of Cedar Mountain, 4 miles north of the Simon mine. The principal claims were located by J. P. Nelson in January, 1915, but it was not until May, after most careful prospecting, that the gold-quartz vein on which the mine is opened was discovered.[a] The property was shortly afterward promoted by F. J. Siebert, and the new

[a] Siebert, F. J., Nevada's latest gold camp: Min. and Sci. Press, vol. 114, pp. 449–450, 1917.

owners soon brought it to the producing stage. A mill was built to treat the ore by cyanidation. Water was supplied from a spring at an altitude of 7,500 feet not far from Little Pilot Peak through a pipe line 9 miles long. In November, 1919, the original mill burned down, and in the fall of 1920 a new one of 70 tons daily capacity was erected and completed. The ore in sight in the mine was then extracted, and operations were suspended on May 1, 1921, pending the raising of funds to explore for the faulted segment of the vein. Although the mine has produced more than $700,000 from ore of good grade—$16 to $20 a ton in gold and silver—yet the profit has been small, because most of it has been put back into exploratory work and in rebuilding the mill after the fire.

The ore was put first through a ball mill and then through a tube mill, 83 per cent of the ore being then fine enough to pass through

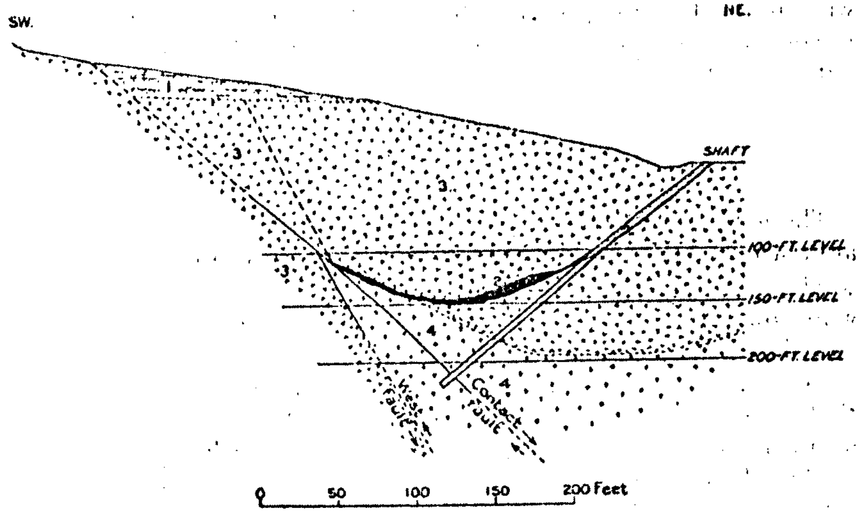


FIGURE 56.—Diagrammatic section through the shaft of the Olympic mine, Nev. 1, Esmeralda formation; 2, gold-quartz vein; 3, upper rhyolite; 4, trachyte.

a 200-mesh screen. The precious metal was then extracted by cyanidation, and a recovery of 90 to 92 per cent was maintained.

The mine is opened by an inclined shaft 225 feet long, which slopes approximately 40° SW. and whose upper portion is sunk on the vein (fig. 56). From this shaft three levels have been turned off—the 100, 150, and 200 foot levels.

AREAL GEOLOGY.

The rocks in the vicinity of the Olympic mine consist of Tertiary lavas, mainly rhyolites, and a series of lake beds, of younger age, the Esmeralda formation, which was laid down probably near the end of Miocene time. The vein itself crops out in a patch of rhyolite that is surrounded by lake and alluvial deposits. Farther from the mine

andesites and other types of lavas appear. The lavas at the Olympic mine differ greatly from those near the Simon mine, 4 miles south, and their mutual relations are not known.

There are three important geologic units at the Olympic mine—two flows of rhyolite and between them a trachyte flow and associated tuff. The oldest rhyolite will be referred to as the lower rhyolite. It crops out on the west flank of the ridge southwest of the mine. It is a white rhyolite rich in phenocrysts of quartz and glassy feldspar, the quartz crystals being especially conspicuous. Under the microscope it is seen that the rhyolite once contained in addition plates of biotite, but these are now completely sericitized, and the feldspar, which proves to be sanidine, is also commonly sericitized.

Between the lower rhyolite and the upper rhyolite lies a flow of trachyte with associated tuff, the two together being roughly 150

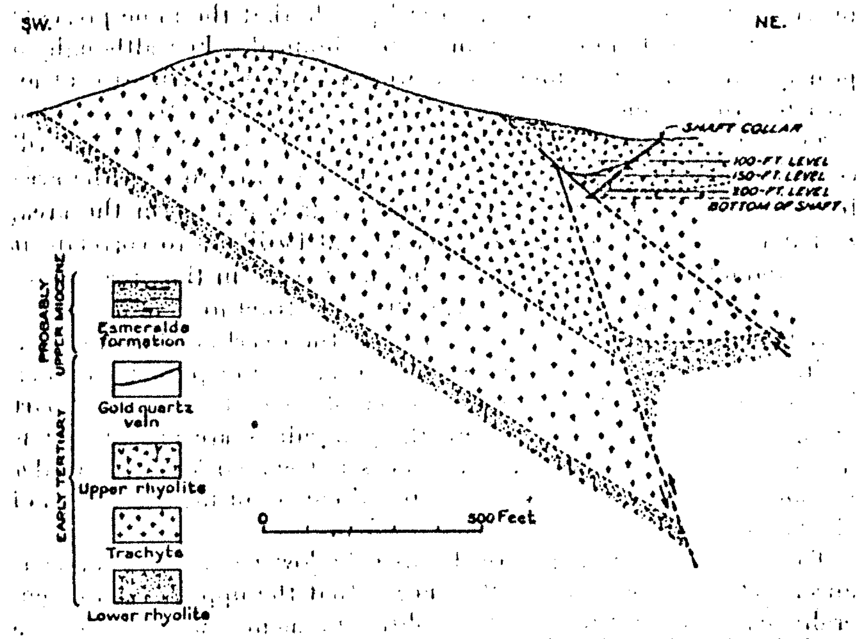


FIGURE 57.—Diagrammatic section through the ridge west of the Olympic mine, Nev., along the line of the shaft.

feet thick. The greater part of the trachyte carries very numerous feldspar phenocrysts, which are much altered (kaolinized or sericitized), some tablets of bleached biotite, and sporadic quartz crystals, in a grayish groundmass that appears rather dark colored in contrast to the rhyolites. It shows fluxion structures, which prove that this rock was a lava. Near the top of the flow the trachyte contains abundant spherulites, the largest the size of a pea, some of which are concentrically banded. This spherulitic facies becomes indistinguishable to the unaided eye from the white tuff that makes up the top of the middle member between the lower and upper rhyolites. Under the microscope the massive trachyte shows numerous phenocrysts of sanidine, much sericitized, surrounded by well-defined fluxion swirls, so that there is no question that this is actually a flow rock. The sanidine phenocrysts are much sericitized, and if any plagioclase was ever present it has been altered beyond recognition. Quartz phenocrysts are exceedingly rare. Thus the rock can be considered to be either a rhyolite in which quartz phenocrysts are exceedingly rare or a trachyte that carries sporadic quartz phenocrysts. The possibility is not wholly ruled out, however, that the rock is a quartz latite whose plagioclase phenocrysts have been wholly sericitized. Provisionally, however, the rock will be here termed trachyte. Different geologists employed by the company have termed it both rhyolite breccia and andesite, and as this rock proves to be the key to the structural puzzle that the mine presents a correct understanding of it must be obtained. For although in principle it makes no difference in working out the structure of an area by what name a rock may be called, yet in practice if a man terms a rock an andesite when in fact it is something else, he will correlate it not only with other masses of the same rock in the area but also with real andesites that may occur elsewhere in the area, and if he names it rhyolite breccia he will be likely to correlate it with undoubted rhyolite breccias that may occur in the area—all of which leads to confusion in interpreting the structure.

Between the trachyte flow proper and the overlying rhyolite is a white tuff or breccia, but whether it is a massive or pyroclastic rock is not everywhere obvious, and it resembles closely the upper part of the trachyte, especially where the spherulites are absent. It is irregular in thickness, but at most does not exceed 50 feet. Under the microscope it is seen to be composed chiefly of minute sherds of glass and is thus clearly of explosive origin.

The upper rhyolite is practically like the lower rhyolite in appearance. The only noticeable difference is that the upper rhyolite generally contains multitudes of rhyolitic fragments, which give it a mottled appearance. The vein crops out in this rhyolite, the upper workings of the mine are chiefly in it, and the east slope of the ridge west of the mine consists of it.

Lake beds of the Esmeralda formation occur in the immediate vicinity of the mine. They partly overlie the upper rhyolite and in part are faulted against it. On account of their soft and unconsolidated character their relation to the rhyolite is poorly shown in the surface exposures, but underground operations have in several places revealed the faults which have let them down against the rhyolite.

THE VEIN.

The vein near the surface strikes N. 20° W. and dips 40° W. It continues at this dip nearly down to the 150-foot level, where it begins to flatten and, becoming horizontal on the level itself, then bends upward until it dips 20° or 25° E. Its farther upward extension is cut off by a fault at 25 feet above the 150-foot level, in the section through the shaft, as shown in figure 56.

The vein ranges from 1 to 7 feet in thickness and averages about 4 feet. The vein filling is dominantly quartz but includes silicified rhyolite and less altered rhyolite. The quartz is white, fine grained, and sugary and in many places shows evidence that it has resulted from the replacement of lamellar calcite. It commonly occurs in a much crushed condition. The gold is not visible, nor does the ore contain any other metallic minerals. The ore first mined carried $20 a ton, and that extracted recently ran $16. The fineness of the bullion was 500 in gold, and the remainder is chiefly silver; evidently the precious metal in the ore is electrum. Prior to the burning of the mill in November, 1919, the mine had yielded 35,000 tons of ore, from which $700,000 was obtained.

FAULTING.

The vein is cut by a number of faults, chief of which are the two known as the Contact fault and the West fault. The Contact fault cuts off the upward extension of the west limb of the vein. The quartz drag found in the gouge of this fault shows it to be a normal fault. The upward bending of the vein has been interpreted by some as the drag effect of this fault; if this interpretation is correct then the segment of the vein that formerly lay in the footwall of the fault must have been removed by erosion, and the mine has practically reached the end of its life. The bending of the vein does not appear ascribable to the fault, however, but to other causes. In the first place, it is significant that the vein begins to flatten as it approaches the underlying formation. In the upper workings it is inclosed wholly in rhyolite; on the 150-foot level the hanging wall is rhyolite and the footwall trachyte. The vein has been deflected parallel to the contact between the upper rhyolite and the trachyte that underlies the rhyolite. Moreover, the rocks inclosing the vein have probably been bent into a syncline (fig. 57), and if this folding occurred after the vein had been formed, as it apparently did, it will account in large part for the structural peculiarity of the vein. On the 150-foot level the bottom of the trough of the vein lies at the shaft, but on the 100-foot level it lies 150 feet north of the shaft. The pitch of the trough is therefore southeastward.

The West fault lies west of the Contact fault; it dips 60° E. and is a reverse fault that brings the underlying trachyte up against the upper rhyolite. Upon the identification of the trachyte depends th interpretation of the structural problem presented by the mine The trachyte forms the country rock of the mine below the 150-foo level and is unquestionably the same rock that crops out on the wes slope of the ridge west of the mine. To account for its position i the mine the hanging wall of the West fault must have moved up a least 300 feet.

The Contact fault, which dips 40° E., is younger than the Wes fault and is a normal fault. The amount of displacement on thi fault is not accurately known but it appears to be small. The inter relations of the two faults are shown in figures 56 and 57. Accordin to the interpretations put on the structure and faulting as shown i those figures, the lost segment of the vein is to be sought in deptl at or near the contact of the upper rhyolite and the trachyte.

The intersection of the two faults at an acute angle has produce a wedge-shaped mass, the apex of which consists of trachyte bounde on each side by rhyolite. This relation is best shown on the 150-foo level.

On the ridge slope southwest of the mine erosion has exposed th apex of the wedge and shows the crushed trachyte inclosed betwee the rhyolite. This exposure has been considered by some to be a andesite dike.

MINA GOLD MINES CO.'S MINE.

On the edge of the flat 2 miles west of the Simon mine there is a old gold mine that was worked on a small scale about 1912. Accord ing to Mr. P. A. Simon, who is a part owner, it produced at that tim $4,400 in gold. The operators merely screened the ore—they ha no crushers—and cyanided the screenings, using water that the hauled from springs in the mountains. The plant is now in decay and three tanks, filled with partly pulverized ore, remain as witness of former activity.

The vein lies at the contact of the Mammoth andesite and th overlying white lava, the keratophyre. It strikes N. 35° W., dip 15°–25° NE., and ranges from 2 to 4 feet in thickness. It is reporte to carry between $7 and $8 a ton in gold. The vein filling consis of calcite, commonly lamellar, or of fine-grained sugary quart which has replaced the calcite; thus it resembles the ore of th Olympic mine.

It has recently been reported [a] that plans are being made to reope the mine, ore of a good grade having been found in the faces.

[a] Personal letter under date of Apr. 11, 1921, from Mr. Robert J. Bonneuoit.

PRELIMINARY REPORT ON SIMON LEAD MINE, MINERAL COUNTY, NEVADA

SCOPE OF REPORT

The Simon Lead mine has been operated intermittently for the past thirty-five years and during that time several reports have been made on it. Geology of the area has been ably covered by Adolph Knopf in U. S. G. S. Bulletin No. 725-H; and a resume of operations is given in U. S. Bureau of Mines Information Circular No. 6941, by William O. Vanderburg.

Water has filled the mine to about the 400 level, so this writer has of necessity had to rely on information gathered from personal interviews with former operators. Of these, Mr. J. H. Simpson is the principal one. He was in charge of operations from 1925 to 1938. This writer became acquainted with Mr. Simpson in 1939, when we worked at the same mine for several years; and we have been fast friends ever since. His integrity and ability, as a mine operator, is never questioned. Incidentally, one of the principal recommendations of this writer is, in the event the mine is to be reopened, to secure, if at all possible, the services of Mr. Simpson to superintend the operation. He is presently a Deputy State Mine Inspector but it is known that he thinks so much of the Simon Lead that it might be possible to get him to return to it.

This rather lengthy explanation of Mr. Simpson is made so that it will be clear what the source of information on tonnage and grade of ore under water is, and why so much reliance is placed upon it by the writer.

Aside from this (and except for figures from actual shipments made in very recent years) the report will cover estimated production costs and profits.

SUMMARY AND CONCLUSIONS

The Simon Lead mine was discovered in 1879 but had no formal operation until 1921. It has been operated in the past mostly during periods of low metal prices.

The mine is opened through two shafts, the old one being inclined, to a depth of 500 feet. A newer shaft (2 compartment and manway) is 800 feet deep, and vertical. There are about 25,000 feet of lateral workings. Surface buildings are in poor condition but can be repaired. The mine is reported to make 125 gallons of water per minute.

The ore, with values in silver, lead, zinc and copper, occurs as replacement deposits in limestone.

Ore reserves are estimated at 100,000 tons having a dollar value at present metal prices of probably $2,500,000. An intelligent development program should increase these materially.

It is assumed here that as soon as possible after the mine is unwatered and old workings cleaned out the mill will be rebuilt, and that it will be of 100 tons daily capacity. Further assuming that mill heads can be maintained at an average of 9 oz. silver, 9% lead, 8.5% zinc and some copper, a recoverable value on the lead and silver alone of $25.20 per ton is indicated. This is after deducting metallurgical and smelter losses; and is believed to be a safe estimate inasmuch as no allowance is made for recoverable values from the zinc and copper.

Estimating operating costs at: Mining $7.00, Milling $5.00, Marketing $2.00 per ton of ore mined, we have a total of $14.00 per ton, which, subtracted from the $25.20 leaves an operating profit of $11.20 per ton. On a 100 ton basis this would be a total of $1,120.00 per day or $336,000.00 per year of 300 opereting days.

In view of these potential profits and the probability of developing much greater tonnages of ore a price for the mine of $500,000 is considered by this writer to be a very fair one provided payments can be spread over long enough time to get an operation under way.

It might be pointed out also that there are three factors which are vital for a successful operation of the property. They are: "Know-how", sufficient working capital and metal prices remaining at the present levels.

PROPERTY AND HISTORY

For the sake of brevity these headings will be given but little space. The property consists of 19 patented claims and some 6 or more unpatented ones, with a total of about 600 acres. They are located in the Cedar Mountain Mining District, Mineral County, Nevada.

The mine was discovered in 1879, but only a few shipments were made until 1919 when silver-lead-zinc sulphides were found. In 1921 a 100-ton mill was erected, and in 1923 this was enlarged to a capacity of 250 tons daily. This was shut down in 1927 and from then until 1938 work consisted mostly of development. Since 1938 production has consisted of a few thousand tons taken out by leasers.

GEOLOGY

As noted before, detailed geology has been described by Knopf in his U.S.G.S. Bulletin. In general, however, it might be said that the orebodies are replacement deposits in limestone along an alaskite dike. This is according to Knopf and while undoubtedly true, it is suggested to this writer from studying the maps that the actual structural control of the mineralization will be found to be a series of branching, parallel fractures in the limestone. This opinion is based on seven years' experience in mining lead-silver ores in limestone replacement deposits in northern Mexico where conditions seem to be similar. Detailed mapping of the underground geology should prove this, and if it is found to be true a very large area, favorable to exploration with short diamond drill holes will be available.

The ore minerals are argentiferous galena and zinc sulphide with (according to Mr. Simpson) appreciable copper content below the 800 level.

MINE WORKINGS

The mine was originally worked through a 500-foot inclined shaft and most of the ore has been extracted from it. In later years an 800-foot vertical shaft was sunk some 500 feet west of the old shaft. Winzes from the 800-foot level go 200 feet deeper, giving a total developed depth of 1,000 feet.

According to Vanderburg there are about 25,000 feet of lateral workings. These, together with the shaft, at today's cost of sinking and driving would represent an investment of approximately $600,000.00.

Mr. Simpson reports that formerly the mine made 55 gallons of water per minute, but after a severe earthquake in 1932 the flow increased to 125 gallons per minute. In 1937 Simpson unwatered the mine by bailing and found that there had accumulated 5 feet of muck on the 800 station. Water level is at present a little below the 400 level.

SURFACE

Thieves and vandals have stripped most of the buildings, but there are 8 or 9 cabins and houses remaining which could be made serviceable by replacing doors, windows and roofing. The hoist-compressor house is in fair shape except for the doors and windows and the mill building is in the same condition. Also, there is a serviceable headframe over the shaft, and good ore bins.

These buildings, with foundations in the mill which could be adapted to new equipment, represent a replacement value of at least $60,000 to $75,000 at today's costs; and could be rehabilitated for an estimated $10,000 to $15,000.

ORE RESERVES

The only map available to this writer showing ore reserves is a longitudinal section of the area around the old shaft. This shows no assay values but does indicate a number of orebodies with an aggregate tonnage of 62,200. Since all of this is above the water level it must have been from some of these bodies that leasers mined in recent years. No doubt most of this ore is of mill grade, but in 1946 twelve cars (about 650 tons) were shipped which averaged 15.1% lead, 11.4 ounces silver and 11.0% zinc. At today's metal prices this would have a net smelter value of $42.18 per ton for the lead and silver alone. This is with lead at 15¢ per pound and silver 90¢ per ounce.

In Vanderburg's paper (written in 1937) he states that considerable development work was done after the mill shut down in 1927, and that according to Simpson about 100,000 tons were blocked out with an average value of: gold .04oz. Silver 9 oz. lead 9%, zinc 8.5% and copper .2 to 3%. This would have a gross metal value (per ton) at present prices, of $36.40, excluding the zinc and copper. Net smelter returns on this grade of ore, before deducting transportation, would be approximately $25.[illegible]. The zinc would give some return, possibly enough to pay transportation.

Mr. Simpson, in talking with this writer in January, 1955, did not remember the tonnage and grade figures just mentioned; but he did say that the second winze away from the shaft had very fine ore. It carried from 1% to 13.8% copper and higher silver values than any other ore in the mine. This is 1200 feet west of the shaft, on the 800 level; and the only work up on the ore is a 27-foot raise. Mr. Simpson says that it could go to the surface, as there are no workings within 500 feet laterally above it.

Mr. Simpson also stated to this writer that the largest new orebody in the mine is between the 800 and 900 levels. It is 125 feet long by 20 feet wide and of unknown vertical extent. He said that it is "typical Simon ore and of shipping grade." An orebody of these sectional dimensions would have 208 tons per vertical foot; so if it extends only fifty feet above and below where it is driven through, it would have 20,800 tons in it. If it is of shipping grade it should carry not less than 10 ounces silver and 15% lead, in which case it would have a recoverable value at the smelter of $40.00 per ton. This would indicate a gross value of more than $800,000 for 20,000 tons, before deducting mining and transportation costs, and not assigning any value for the zinc content.

It will be noted that in estimating the net smelter value of shipping ore the writer has not included any value for the zinc content. This is because the exact schedule of payment for this metal, in crude ore, is not known; but it would be small. In zinc concentrate, from milling, however, we can estimate that payment would be made on, say, 70% of the zinc at, probably, 3¢ under the market quotation.

The 62,200 tons of ore in the old workings would no doubt be mostly of milling grade. If we assign a value for estimating purposes, of 5 oz. silver, 6% lead and 5% zinc it would have a smelter recoverable value on the concentrates of $20.60 per ton, at present metal prices. This would indicate a gross recoverable value for the 62,200 tons of $1,281,320.00.

Thus in the 83,000 tons on which has been estimated grade, we have a total gross recoverable value of more than $2,000,000; and this does not include any value for the ore mentioned by Mr. Simpson in the second winze away from the shaft. The total estimated recoverable value from the 100,000 tons mentioned in the Vanderburg report is $2,500,000 at today's prices, which checks closely enough, inasmuch as the first estimate has disregarded the indeterminate values in the second winze.

Assuming a mining cost of $7.00, milling at $5,00 per ton and marketing $2.00 on the 100,000 tons there would be an operating profit of approximately $1,100,000.00.

RECOMMENDATIONS

The first step in getting an operation under way would be to repair enough of the old houses to care for a starting crew of 8 or 10 men. The hoist house should also be repaired and a hoist installed so that unwatering of the mine could follow.

To unwater, it is recommended that a deep well or turbine pump be used. This should have a capacity of at least 300 gallons per minute. For power two diesel-generator sets should be provided, so that standby power is available at all times.

As each level is dewatered it should be cleaned up and timbered where or if needed. Condition of the workings which have been under water for years is entirely unknown, although Mr. Simpson says that in general the ground stands well.

After the mine has been unwatered and the workings rehabilitated mining of the shipping ore on the lower levels can start. At this time, and as development proceeds, plans should be laid for rebuilding the mill. From present information it is believed that one of 100 tons daily capacity will be the right size to maintain a balanced operation. Concentration will be by selective flotation, and undoubtedly a copper circuit will be required since values of this metal are increasing in depth. It might be noted here that no account of copper values has been taken in the estimates; but a copper content of 2% in the ore would give an additional recoverable value of approximately $8.75 per ton at 29¢ copper.

Harry H. Hughes, E. M.

Goldfield, Nevada
January 19, 1955

1946 Shipments from SIMON LEAD
From 400' Level
Shipped to U. S. Smelter at
Salt Lake City, Utah
By: Merl Swanson, Mina, Nevada

Lot No.	Dry Wt. Tons	AU	AG	CU	PB	ZN
1	53,663	.0075	13.38	.03	16.9	9.47
2	62.837	.0125	13.18	.08	17.3	10.94
3	60.987	.0085	14.55	.05	19.1	11.78
4	60.611	.01	13.65	.23	18.4	12.24
5	54.864	.01	10.5	.19	13.95	10.87
6	58.437	.01	8.75	.14	11.85	11.1
7	59.470	.01	10.4	.15	14.1	10.95
8	59.108	.01	13.53	.15	18.3	11.3
9	50.969	.01	12.2	.14	15.9	11.7
10	54.563	.01	10.75	.28	13.8	10.88
11	53.881	.01	10.35	.15	13.45	13.6
12	48.221	.01	6.5	.11	8.75	6.9

11.5
.125
15.15
10.0

FORM C-8 REVISED 1954 10M-6-56-K

AMERICAN SMELTING AND REFINING COMPANY

SELBY SMELTING WORKS

BOX 52 SELBY, CALIFORNIA

~~San Francisco Calif~~

JUNE 25, 1959

RETURNS OF LEAD ORE

RECEIVED OF MERL SWANSON
P. O. BOX 172
MINA, NEVADA

SELBY LOT 1378

Shipping Point: Mina, Nevada

SP-366923

Mark: Simon Lead Mine
Date Rec'd: 5-27-59

Bulk Weighing gross	119460	lbs.
Tare		lbs.
		lbs.
Moisture 4.38 %	5232	lbs.
Samples		lbs.
NET DRY WEIGHT	114228	lbs.

ASSAYS and ANALYSIS		
Gold	TR	ozs. p. t.
Silver	5.5	ozs. p. t.
Lead	8.7	%
Copper	TR	%
Insol	61.4	%
Iron	5.0	%
Zinc	4.0	%
Sulphur	.6	%
Lime	3.6	%
Arsenic	1.0	%
Antimony	.1	%
Tin		%
Bismuth		%

Paid to: Above

PERCENTAGES and PRICES	DEBITS		CREDITS	
Less % @				
Less 1/2 oz % @ 91 3/8¢ - 1¢			4	52
Less - units less 10 % @ 12.00 per lb. less 2¢			15	66
Less units @ per lb. less				
Excess Value over $12.00 @ 35%	2	86		
Excess Arsenic & Antimony .1 unit @ 50¢		05		
Base Charge	2	00		
Total	4	91	20	18
Value Per Ton			15	27
Value of 114228 lbs. @ $15.27 per ton			872	13
Sampling and Assaying				
Freight to Selby 119460# @ $6.91 N.T.	412	73		
Total	412	73	872	13
NET PROCEEDS			459	40

IMPORTANT!
If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process. — American Smelting and Refining Company.

6161

FORM C 8 REVISED 1954 10M-8-56-K

AMERICAN SMELTING AND REFINING COMPANY
SELBY SMELTING WORKS

JULY 8, 1959

RETURNS OF ORE

RECEIVED OF MERLE SWANSON
P. O. BOX 172
MINA, NEVADA

SELBY LOT 1495

Shipping Point			
Mina, Nevada	Bulk Weighing gross	121180	lbs.
SP 361007	Tare		lbs.
			lbs.
	Moisture 2.10 %	2545	lbs.
	Samples		lbs.
Mark	NET DRY WEIGHT	118635	lbs.
Date Rec'd 6-23-59			

ASSAYS and ANALYSIS			PERCENTAGES and PRICES	DEBITS		CREDITS	
Gold	0	ozs. p. t.	Less % @				
Silver	4.6	ozs. p. t.	Less 1/2 oz.% @ 91 3/8¢ - 1¢			3	71
Lead	7.65	%	Less units less 10 % @ 12.00¢ per lb. less 2¢			13	77
Copper	0	%	Less units @ per lb. less				
Insol	65.2	%					
Iron	4.9	%					
Zinc	3.8	%					
Sulphur	.4	%	Excess Value over $12.00 at 35%	1	92		
Lime	3.0	%					
Arsenic	1.0	%	Excess Arsenic & Antimony .1 Units @ 50¢		05		
Antimony	.1	%					
Tin		%					
Bismuth		%					
PAID TO:	Above						
			Base Charge	2	00		
			Total	3	97	17	48
			Value Per Ton			13	51
			Value of 118635 lbs. @ $13.51 per ton			801	38
			Sampling and Assaying				
			Freight to Selby 121180# @ $6.91 Per Ton	418	68		
			Total	418	68	801	38
			NET PROCEEDS			382	70

IMPORTANT!
If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process. — American Smelting and Refining Company

7037

FORM C-8 REVISED 1954 [illegible]

AMERICAN SMELTING AND REFINING COMPANY

SELBY SMELTING WORKS
405 MONTGOMERY ST

San Francisco, Calif.

JUNE 2, 1959

RETURNS OF LEAD ORE

RECEIVED OF MERL SWANSON
P. O. BOX 172
MINA, NEVADA

SELBY LOT 1362

Shipping Point Mina, Nevada	Bulk Weighing gross 132360 lbs.
	Tare lbs.
	lbs.
SP-152942	Moisture 3.48 % 4606 lbs.
	Samples lbs.
Mark	NET DRY WEIGHT 127754 lbs.
Date Rec'd 5-19-59	

ASSAYS and ANALYSIS		PERCENTAGES and PRICES	DEBITS	CREDITS
Gold	0 ozs. p. t.	Less % @		
Silver	4.45 ozs. p. t.	Less 1/2 oz. @ 91-3/8¢ - 1.0¢		3 57
Lead	7.55 %	Less - units less 10 % @ 12.00¢ per lb. less 2.0¢		13 59
Copper	0 %	Less units @ per lb. less		
Insol	63.0 %			
Iron	4.8 %			
Zinc	4.1 %	Excess value over $12.00 @ 35%	1 81	
Sulphur	.2 %			
Lime	3.9 %			
Arsenic	.6 %			
Antimony	.1 %			
Tin	%			
Bismuth	%			
PAID TO:	Above			
		Base Charge	2 00	
		Total	3 81	17 16
		Value Per Ton		13 35
		Value of 127754 lbs. @ $13.35 per ton		852 76
		Sampling and Assaying		
		Freight to Selby 132360# @ $6.91 N.T.	457 30	
		Total	457 30	852 76
		NET PROCEEDS		395 46

IMPORTANT!
If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process. — American Smelting and Refining Company.

5192

ASM C-8 REVISED 1954 10M 5-56 A

AMERICAN SMELTING AND REFINING COMPANY

SELBY SMELTING WORKS
405 MONTGOMERY ST.

San Francisco, Calif.
MAY 13, 1959

RETURNS OF LEAD ORE

RECEIVED OF MERL SWANSON
P. O. BOX 172
MINA, NEVADA

SELBY LOT 1247

Shipping Point Mina, Nevada

SP-367024

Mark
Date Rec'd 4/17/59

Bulk Weighing gross	116740	lbs.
Tare		lbs.
		lbs.
Moisture 3.13 %	3654	lbs.
Samples		lbs.
NET DRY WEIGHT	113086	lbs.

ASSAYS and ANALYSIS		
Gold	0	ozs. p. t.
Silver	4.8	ozs. p. t.
Lead	7.6	%
Copper	TR	%
Insol	60.2	%
Iron	4.6	%
Zinc	2.8	%
Sulphur	.4	%
Lime	7.0	%
Arsenic	.9	%
Antimony	.1	%
Tin		%
Bismuth		%

PAID TO: Above

PERCENTAGES and PRICES	DEBITS	CREDITS
Less % @		
Less 1/2 Oz. % @ 91-3/8¢ less 1.0¢		3 89
Less - units less 10 % @ 11.00¢ per lb. less 2.0¢		12 31
Less units @ per lb. less		
Excess value over $12.00 @ 35%	1 47	
Base Charge	2 00	
Total	3 47	16 20
Value Per Ton		12 73
Value of 113086 lbs. @ $12.73 per ton		719 79
Sampling and Assaying		
Freight to Selby 116740# @ $6.91 N.T.	403 34	
Total	403 34	719 79
NET PROCEEDS		316 45

IMPORTANT!
If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process. — American Smelting and Refining Company

5058

APPENDIX NO. 8

This is L. B. Spencer's report made in 1930. It contains many assays and exarpts from the daily report. None of the maps that accompanied Spencer's report are available for study at the present time.

Mr. Spencer, at the time he wrote the above report, was accustomed to make a survey of the Simon Mine each month, and report the progress made developing the mine. His knowledge is all first hand. This report is quite accurate and came into the writer's possession in 1933 when B. B. Bryan wanted to sell the property.

COPY

REPORT TO

SIMON SILVER LEAD MINES, INC.,

SIMON, NEVADA.

ON

SIMON MINE

FROM EXAMINATION MADE BY

L.B.SPENCER,

MINING ENGINEER,

MINA, NEVADA.

Dated June 23, 1930

(BB Memo - I think Spencer is known as State of Nevada examiner. Report was, I understand, furnished to S.F.S.&K. Mining Exchange before latter Exchange permitted trading under new Cal. laws. Please study assay sheets).

L. B. Spencer, Mining Engineer,
Mina, Nevada.

June 23, 1930.

Simon Silver Lead Mines, Inc.,
Simon, Nevada.

Gentlemen:-

As requested by you I have examined the Simon Mine and have prepared the following brief report:

LOCATION: The location of this property is shown on Maps No. 1 & 2 which accompany this report. It lies about 22 miles northeast of Mina, Nevada, a town at the terminal of the So. Pacific R.R. in Southern Nevada. A good road, suitable for trucking and travel extends from this supply point to the mine.

TITLE: The property consists of 35 claims, 20 of which are patented, and 15 locations upon which the annual work has been regularly performed. All mining requirements and regulations have been complied with and all claims are accurately and definitely staked on the ground so as to be readily identified. The claim map accompanying this report shows the group as a whole.

GEOLOGY: The ore bodies of the Simon Mine occur along an alaskite dike which generally lies along the contact between Triassic limestone and Tertiary flows and intrusives. The ore frequently forms as replacement bodies in the limestone near the contact. A brief description of the geology of Cedar Mountains, in which the Simon Mine is situated, is given in Bulletin 725H of the U. S. Geological Survey by Adolph Knopf, from an examination he made in 1919. Subsequent development work has in general borne out Mr. Knopf's deductions.

In general the ore occurs along the Simon foot-wall which forms the boundry of the upper ore bodies on the south. These have been faulted by numerous cross faults cutting segments with a displacement downward and to the south and west in a series of off-sets. On this account the new work now being done on the 800 and 900 levels west is of great importance.

The ore is a lead-zinc sulphide carrying silver which in the lower levels has also an added silver value due to copper sulphide coming in with important percentages.

WORKINGS: The workings of the Simon Mine consist of an 800 foot shaft of two compartment manway from which levels extend to 353, 442, 505, 706 and 807 feet deep respectively. In addition to those the old workings to the east have the 252 level and several smaller above this. Of these levels separate maps are included in this report on which the positions of the ore bodies and blocked out ore given below are indicated.

ORE IN SIGHT: At the present time the following orebodies have been developed and opened up for production. From some considerable tonnage has been taken at the time of the last mill run so the amounts given are the estimated tonnage remaining:

509 stope from 505 raise	10,000 tons
410 stope below 353 level	4,600 "
409 stope above 353 level	5,200 "
403 stope below 353 level	6,000 "
401 stope above 353 level	3,000 "
356 stope above 353 level	1,000 "
354 stope above 353 level	4,200 "
	3,000 "
Total Ore in sight	37,200 "

In addition to these ore bodies there are the following partially developed ore shoots which are estimated as probable ore:

Between 700 and 800 levels:

807 stope below 700 level	8,000 Tons
808 above 800 level	3,000 "
812 above 800 level	2,000 "
Between 800 and 900 levels	12,000 "
Probable Ore	25,000 "

As to the value of the ore per ton, from the stope of the blocked-out ore, the average of about 30,000 tons milled was 2-1/2 ounces silver, 4% lead and 5% zinc. In the samples taken from the ore in the lower workings, both lead and zinc values are higher, 7 to 9% and in addition from 3% to 10% copper is found and the silver values more than doubled.

(Tonnage estimated low 100,000 tons. J. T. Robertson.)

EQUIPMENT: The property is equipped with a double drum electric hoist 125 HP capable of sinking to 1500 feet deep if necessary, to 100 HP compressor and motors, ample machine and blacksmith shop, a 250 ton mill equipped with flotation machinery to handle the complex ores of the property. This mill sets near the main shaft so the ore is handled direct to the mill when hoisted. There are enough housing accommodations to take care of 200 men. Electric power is supplied by the Mineral County Power System where main transmission line ends at the Simon Mine. The water supply is pumped from one of the upper levels of the mine and is clean and wholesome. There is plenty of water for the mill operation when metal prices permit.

GENERAL REMARKS: The property as a whole has been much improved by the past year's development work and is now showing important mineralized areas through which are of higher grade than any heretofore encountered. The 800 level has been extended about 1000 feet west and south along the lime-porphyry contact. It cuts through an important series of ore lenses and ore of different character to that of the upper levels, indicating, it seems to me, another period of ore deposition carrying copper and higher silver values as well as a richer content of the lead and zinc. Having been acquainted with the progress of this mine almost from its first production and knowing the structure from many examinations over a period of the past ten years, I consider the 900 level development work is sure to open up important ore bodies. As to further ore of milling grade in the upper workings, these have by no means been exhausted and there are several showings that justify investigation and development work. The354 stope which produce a part of the last mill run was discovered through such work and there are many places just as important.

In conclusion, while operation of the mill upon the grade of ore showing in the stopes cannot be profitable under the present price of metals (June 23, 1930) any reasonable increase in these prices will permit it and the increase metal content from the ores of the lower levels may at any time be sufficient to overcome all present deficiencies.

Respectfully submitted,

(Signed) L. B. Spencer.

SIMON SILVER LEAD
MINES INC.
ASSAYS

816 Winze & 100 Ft. Station

		Au	Ag	Pb	Zn	Cu
12' down	Cut 2-1/2 Ft.	-	6.88	3.8	-	2.4
27'	Cut 6 Ft.	.-5	18.8	18.5	12.2	5.5
[illegible]	Muck grab	.04	5.28	6.02	-	.4
[illegible]	cut 4 ft.	.04	19.6	17.0	13.5	3.6
67' - 70'	16 car comp.	.04	15.28	8.0	6.5	6.8
70' - 73'	20 car comp.	-	8.24	7.4	-	1.0
73' - 76'	15 " "	-	11.2	9.6	-	2.0
76' - 79'	15 " "	.04	10.28	9.5	6.2	2.8
79' - 82'	16 " "	.04	7.64	6.3	5.5	2.2
82' - 85'	16 " "	.04	8.60	9.6	7.0	1.4
85' - 88'	14	.04	7.6	6.3	5.5	2.2
88' - 91'	17	.04	4.36	3.4	2.0	1.2
100' - 111'	30	.04	5.72	7.1	4.5	.2
111' - 114'	18	.04	5.0	6.2	3.1	.4
114' - 117'	17	.04	7.28	9.4	6.1	.8
122'	cut 5 ft.	.02	6.04	7.2	6.5	.2
122' - 136'	75 car comp.	.04	7.4	7.7	4.5	.4
136' - 151'	65	.04	7.32	8.2	5.2	
151' - 165'	65	.04	10.6	12.5	8.7	.0
165' - 170'	32	.06	5.44	7.7	5.3	
170' - 172'	100	.08	6.24	7.2	4.5	
1000 ft. Sta. (East Wall)	cut 14 ft.	.08	4.72	10.0	8.1	.2

905 Drift

		Au	Ag	Pb	Zn	Cu
From 902						
0-5	15 car comp.	.04	12.48	9.5	6.2	3.1
5-10	12	.04	15.08	11.6	5.5	3.1
10-15	12	.04	10.04	7.5	3.2	-
15-19	12	.04	16.92	12.6	8.2	2.7
19-23	10	.04	16.16	9.8	5.5	3.6
23-27	8	.04	14.52	8.6	4.8	4.1
27-31	10	.04	12.4	6.2	4.5	2.8
31-35	14	.06	9.76	7.0	5.2	1.8

1001 Drift

		Au	Ag	Pb	Zn	Cu
From 1000 Sta.						
15' - 23'	Car sample	.08	5.36	7.5	5.3	
25' - 29'	" "	.06	7.04	6.1	3.3	
8'	cut sample 3'	.08	15.08	24.9	20.3	
108'	" " 2'	.04	23.32	19.6	16.8	6.5

1002 Drift

		Au	Ag	Pb	Zn	Cu
30'	cut sample 3'	.16	21.00	14.1	8.5	12.8
93'	" " 4'	.06	4.92	6.5	7.0	
[illegible]	" " 4'	.08	8.08	12.3	12.1	
[illegible]	" " 6'	.04	7.24	9.5	8.0	

911 Drift

		Au	Ag	Pb	Zn	Cu
From 816 Winze						
60' #17	2' cut	.10	42.00	16.5	10.5	13.8

910 Drift

		Au	Ag	Pb	Zn	Cu
60' #77	picked sample	.08	28.72	19.5	8.1	3.8

Aug. 6, 1934

SUMMARY OF WORK DONE IN
SIMON MINE FROM JULY 1, 1930
UNTIL SHUTDOWN MARCH 1, 1932

In July and August 1930, the 902 Drift was advanced about 160 feet to a total of 665 feet, where it connects with the 916 Drift. (SHOULD BE 910 38W) 20 feet of ore was found at the junction, (@ 905) very high grade, and this was later cross-cut, as described further on.

During the same time the 910 drift was advanced 157 feet with 4 feet of ore at the end. The 911 drift was also advanced 30 feet or more, a little nice ore being encountered at the end.

The 905 drift was run 39 feet during September and Cctober 1930, from where the 902 and 910 came together, and of the ore found, Whitney stated in a letter at the time, "This is some of the finest ore ever seen in the mine". An assay, September 15, 1930 of a black high-grade sample showed: -

	Gold	0.08 ozs.	
	Silver	28.7 "	
A.	Lead	19.5%	905
	Zinc	8.0%	
	Copper	3.8%	

89 cars of ore were taken out of this drift and a composite average of 8 assays covering them is as follows:

	Gold	.04 ozs.	
	Silver	12.0 "	
B.	Lead	9.0%	905
	Zinc	5.7%	
	Copper	3.0%	

Whitney also stated this was the finest lot of high-grade ore encountered in the Simon mine. The 905 drift was discontinued at this point, as it encountered the Mammoth Fault, and it was to re-discover this ore body and the 1000 foot level that the 1001 drift was run. The same ore was found in the 1001 drift just before the power failure in 1931 caused us to lose the 1000 foot level, as described in the account of the work on the 1001 drift.

In September 1930, the 913 Cross-cut was run a few feet off the 911 drift and a two foot sample assays:

	Gold	0.1	ozs.	
	Silver	42.1	"	
C.	Copper	14%		913
	Lead	16%		
	Zinc	10%		

During November and December 1930, the 816 Winze was put down to completion, bottoming at the 1000 foot level. It was in ore the first 87 feet and then dipped under the ore. At the bottom ore showed on the right. During this time 201 cars of ore were taken from the winze, and an average of the assays made on the samples taken from them shows:

	Gold	0.04	ozs.	
D.	Silver	8.0	"	816 Winze
	Lead	9%		
	Zinc	6%		

During the first six months of 1931, until the power failure stopped the work, two drifts, 1001 and 1002, were run in opposite directions from the bottom of this winze.

The 1001 drift was in ore the first 30 feet, when alaskite was encountered on the face and the ore stopped. From this point on ore was found at irregular points. An average of assays made from three cut samples 15 feet in from the bottom of the winze shows:

	Gold	.08	ozs.	
	Silver	4.72	"	
E.	Lead	10%		1001
	Zinc	8.1%		
	Copper	.2%		

Altogether the drift was in ore 80 feet of its length of 150 feet. March 15, 1931 a pocket of high grade ore was encountered from which three or four cars were taken, assaying:

	Gold	.04	ozs.	
	Silver	23.32	"	
F.	Lead	19.6%		1001
	Zinc	16.8%		
	Copper	6.5%		

Near the end, 150 feet from the winze, the drift was in the same high grade ore as was found above in the 905 drift and which was considered the best ore ever found in the Simon mine. This is most important as showing the downward extension of this ore. Just at this most interesting point there was a power failure in the Mineral County Power System and it was 18 hours before current was again available to run the pumps. Meanwhile the water had risen above the top of the 1000 foot level, drowning out the pumps and short-circuiting the motor in spite of its having been raised as high as possible. Before arrangements could be made to remove the surplus water it had risen to such a point that it was not deemed wise to attempt to regain this level under the conditions prevailing at the time.

During the first six months of 1931 the 1002 drift was also extended 150 feet with varying amounts of ore showing, and approximately the last 60 feet being in ore. At one point the ore was 10 feet wide due to sluffing; 14 feet from the bottom of the winze the ore was 1 foot wide, and at 30 feet was 2 feet wide. Ten days later there were showings of ore containing copper. A month later 100 feet in, five feet of ore assayed:

G.	Gold	.06 ozs.	
	Silver	5.0 "	
	Lead	7.0%	<u>1002</u>
	Zinc	7.0%	
	Copper	.3%	

Three weeks later, March 27, 1931, this drift was in ore assaying:
H.
Lead 10%, Copper .7%; also zinc and silver <u>1002</u>

In April 1931, some work was done on the 821 drift and two assays covering four feet of ore were made:

		High-grade ore	"Peacock Ore"	
I.	Gold	.08 ozs.	.1 oz	
	Silver	35.28 "	13.2 "	
	Lead	30.3%	13.5%	<u>821</u>
	Zinc	25.7%	7.6%	
	Copper	.5%	Trace	

After the 1000 foot level was abandoned, from August 1931 to March 1, 1932, the 900 drift was advanced 393 feet for development purposes partly in limestone and partly on lime-porphyry contact and several small bunches of ore were found. Some were encountered 105 feet from the 803 winze; 136 feet further small bunches of ore showing copper. About 50 feet from the end a cross-cut showed 4 feet of ore and a raise was also run up 11 feet of which 7 feet were ore of good quality.

In December 1931, a 914 Cross-cut was run 91 feet, mostly porphyry, and a 915 Cross-cut was run in January and February, 1932, but did not develop important ore. In the same period a 915 raise was run 51 feet 40 feet of which showed varying amounts of the same ore as found in 821 drift above. An assay at 35 feet shows:

J.	Gold	.08 ozs.	915 Rse
	Silver	12.32 "	
	Lead	17.2%	
	Copper	.3%	

The following assays Jan. 31, 1932, are also from the 915 raise;

		11 cars	15 cars	
K.	Gold		.02 ozs.	915 Rse
	Silver	5.2 ozs.	7.08 "	
	Lead	3%	3.6%	
	Zinc	3.2%	3.4%	
	Copper		Trace	

The following are some assays made during Jan., Feb., and March 1931.

	1002 30 ft. in	1001 8 ft. in	1001 13 cars	1002 93 ft. in	1002 4 ft. wide	1002 124 ft. in
Gold	.16 ozs.	.08 ozs.	.04	.08 ozs.	.06 ozs.	.04 ozs.
Silver	21.0 "	15.08 "	2.24%	8.08 "	4.9 "	7.24 "
Lead	14.1%	24.7%	1.4%	12.3%	6.5%	9.5%
Zinc	8.5%	20.0%	1.5%	12.4%	7.1%	8.1%
Copper	12.8%	—	Trace	.5%	.3%	.9%

	1001 0 108 ft. in — picked	Aug. 1931 - 821 100 ft. in	April 1931 - 821 At connection
Gold	.04 ozs.	.1 ozs.	.08 ozs.
Silver	23.34 "	13.2%	25.1 "
Lead	19.6%	13.5%	30.0%
Zinc	16.8%	7.6%	25.7%
Copper	6.5%	-	-

The information and data on which the above report is based are contained in various reports, letters, assays, etc. which are all in files of the company at Simon, Nevada.

The following estimate of all ore reserves was made by J. T. Robertson and J. H. Simpson on November 7, 1932, and the first 12 items were covered by Spencer's report, whose estimate differs somewhat in some cases.

505 stope	10,000	tons	
410, below 353	5,000	"	46,000 above 700
409 stope	10,000	"	
403 below 353	6,000	"	
401 above 353	3,000	"	
356 above 353	2,000	"	
354 " "	10,000	"	
Ore on dump	4,000	"	
706, below 700-800	8,000	"	
808 above 800 level	3,000	"	
812 " " "	2,000	"	
12 808 winze, between 800 & 900	12,000	"	
Probable ore to 50 ft. below 900 ft level, 808 winze	10,000	"	
821 above 800	1,000	"	
800-900	1,000	"	
816 winze 800-900	2,000	"	4,000 Tons in winze
900-1000	2,000	"	
1002 drift, above 1000 ft. level	2,000	"	2,000 "
905 below 900 ft. level	2,400	"	
1001 above 1000 ft. level	1,500	"	1,500 "
	96,900	tons.	7,500 Tons for 816 ore...

See next page for comparison

PROBABLE ORE BELOW PRESENT WATER LEVEL.

816 Winze Body

Probable ore. This ore body is exposed on the 1000 foot 120 feet along the drift. On the 800 foot level for 80 feet with an average width of at least 5 feet. Depth exposed is 210 feet on stope and figures 210,000 cu. feet, or 21,000 tons. From 35 assays taken as work progresses with many samples made or 10 to 20 car composites, this ore body will run:- Gold .04 oz., Silver 10.6 oz., Lead 10.4%, Zinc 7.3%, Copper 2.9%. This estimate taken only between the 800 foot and 1000 foot levels, extentions taken both up and down may be expected which will at least double it.

219 FT

100' L x 210' Hi x 10' wide

905 Ore Body

Probable Ore. As exposed in the 902 and 905 driftd on the 900 foot level and in 811 and 815 cross-cut, on the 800 foot level. A corner apparently cut in the 1001 drift on the 1000 foot level. Figured as pyramids above and below, this body contains 13,000 tons and an average assay about:

Gold .04 oz. Silver 9.0 oz. Lead 8.4%
Zinc 4.7%, Cu. 2.6%

If figured as a prism instead of two pyramids, this body contains about 18,000 tons.

801 Ore Body

Probable Ore. This body is exposed for 140 feet along 901 and 902 drifts on 900 foot level, shows in 811 and 812 driftd on the 800 level for 90 feet. Average width 10 feet. Estimated, 12,000 tons. Assays:-

Silver 8.1 oz., Lead 8.2% Zinc 7.8%

MINING COSTS PER TON

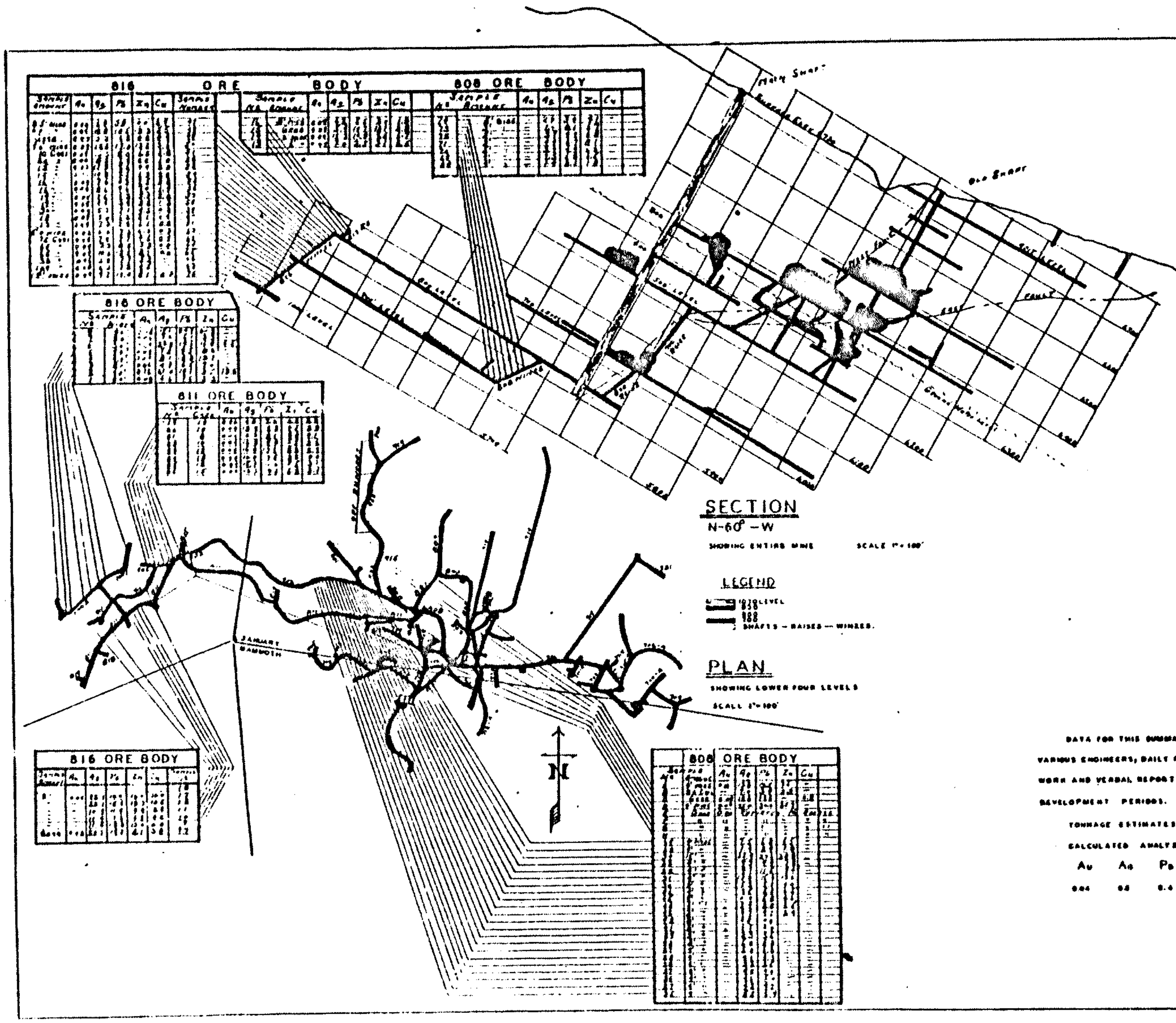
	Past	Future
Explosives	$0.15	$0.15
Repair and Maintenance	0.06	0.04
Timbers	0.46	0.30
Liability Insurance	0.10	0.08
Power	0.17	0.14
Mine Office	0.19	0.10
Labor	1.59	1.26
Interest	0.02	
Supplies	0.03	0.10
General Expens	0.73	0.24
Fire Insurance	0.01	0.01
Assaying, Engineering	0.03	0.03
Taxes	0.01	0.01
Hoisting	0.22	0.22
	$3.77	$2.68

MILLING COSTS PER TON

Crusher and Conveyor		
Labor	.04	.04
Power	.06	.05
Supplies	.03	.01
Concentrator		
Royalties	.05	.01
Labor	.35	.34
Repair & Maintenance	.06	.04
Power	.46	.30
Tails Disposal	.03	.03
Reagents	.17	.21
Liability Insurance	.03	.02
Balls	.09	.12
Mine Office	.20	.10
Supplies	.07	.05
Interest	.02	
Assaying	.06	.02
Taxes	.02	.02
Repair Supplies	.03	.06
Fire Insurance	.03	.03
Water Supply	.15	.02
Labor, Water	.15	.05
Replacements	.02	.06
General Expence	2.42	1.30

Last Operations	Aug. 20, 1926 to Jan. 31, 1927		
Tons of ore milled, 27,542	Ag. 2.5 oz.	Pb 4.00%	Zn. 4.85%
1—Tons of Lead Conc. made 1,648	31.52	57.54	8.17
2—Tons of Zinc Conc. made 1,509	5.00	4.0	46.4
Tailings	.35	.33	1.80

1—— Shipped to U.S.S.R. & M. Co. at Midvale
2—— Shipped to Vieille Montagne Co. Chenee Belgium



DATA FOR THIS SUMMARY SHEET TAKEN FROM REPORTS BY VARIOUS ENGINEERS, DAILY PROGRESS REPORTS ABOUT DEVELOPMENT WORK AND VERBAL REPORTS FROM FOREMEN IN CHARGE DURING DEVELOPMENT PERIODS.

TONNAGE ESTIMATES VARY FROM 40,000 TO 75,000.

CALCULATED ANALYSIS

Au Ag Pb Zn Cu

COMPILATION AND ARRANGEMENT BY S. POWER WARREN.

SIMON MINE

MINERAL COUNTY, NEVADA

Ralph Tuck
1107 East South Temple
Salt Lake City, Utah

June 13, 1968

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ILLUSTRATIONS

SIMON MINE

MINERAL COUNTY, NEVADA

Summary

An examination of the Simon Mine was made at the request of Federal Resources Corporation particularly to determine if conditions might be favorable for larger and higher-grade ore bodies than heretofore found.

The property which is held under a lease and option to purchase agreement is about 26 miles by a good gravel road northeast of Mina, Nevada. Mineralization was found prior to 1900, but the principal work consisting of a number of thousandfeet of underground workings to a depth of 1,000 feet was done in the period 1918 to 1932. During this time over 75,000 tons averaging about 3 ounces silver, 4.9% lead, and 5.7% zinc were treated in a flotation mill on the property. Subsequently, in the 1940s and 50s, about 15,000 tons more were produced from above the water table. All of this work resulted in a considerable financial loss with the probable exception of part of that in in the 1940s and 50s.

In 1963 Federal Resources took the property, principally on the basis of old reports which showed a considerable tonnage of fair grade that had been left unmined because of the depression of the 1930s. During unwatering the old shaft was found to be badly caved so a new one was sunk to a depth of 1,088 feet. New 800 and 1000 Levels were driven, and a large amount of underground work and surface and underground drilling was done. Through April, 1968, Federal hoisted to the surface and stockpiled about 18,000 tons of ore averaging 4.2 ounces silver, 4.8% lead, 4.6% zinc, and 0.2% copper and in addition about 4,000 tons of development muck averaging 1.6 ounces silver 2.0% lead, and 2.1% zinc.

The mineralization consists of galena, sphalerite, chalcopyrite, and a slight amount of pyrite. The mineralized bodies are relatively small and very irregular replacements of limestone. Stoping costs are high, as the mineralization can only be mined by square-set and filled stopes. The small size of the stopes makes development costs per ton high, and the few available working places have contributed materially to the excessive overall costs relative to the grade of ore.

Because of the extreme irregularity of the mineralization it is very difficult to estimate reserves, but it is probable there are a few thousand tons more similar to that stockpiled that are fairly accessible from the present workings. Old reports have estimated 30,000 tons available adjacent to stopes in the old workings, but because of ground conditions it is improbable that they could be mined profitably.

Federal's underground exploration in the vicinity of the known ore bodies has been thorough and further work here is not recommended. If further exploration is contemplated a surface diamond drilling program of about 4,500 feet is suggested; however, it is very speculative.

The work to date has been disappointing, and it is apparent that the old reports were overly optimistic in regard to tonnage, grade of ore in some places, and mining conditions. Geologically there is no reason to expect to find larger and better-grade ore bodies. and since present operations are unprofitable it is logical to bring the work to a close.

Since the suggested surface drilling is highly speculative and not necessarily recommended, it might be possible to interest a company with considerable risk money, such as one of the oil companies that are now diversifying into mining, to undertake the program.

Introduction

This report on the Simon Mine is the result of an examination requested by Federal Resources Corporation. Current underground work at the property has been disappointing. The ore bodies found have been much smaller and more irregular than portrayed by old reports, particularly that of L. B. Spencer. Mining and development costs have been high, and with only a low to medium-grade ore resulting from unavoidable dilution, operations have been showing a considerable monthly deficit. The purpose of this examination was primarily to determine the probability of finding higher-grade and larger ore bodies.

May 20th to 26th was spent at the property examining the surface, the underground workings of the past few years, and the available data in the mine office. Mr. A. B. Newman who is in charge at the mine was extremely helpful in aiding the investigation.

General Features

The property, which consists of 20 patented and 10 unpatented mining claims, lies at an elevation of from 6,500 to 6,800 feet in the Cedar Mountains on the eastern edge of Mineral County. It is about 26 miles by a good gravel road northeast of the town of Mina, which is the terminus of a branch line of the Southern Pacific Railroad and is also on U.S. Highway 95.

The property is held by Federal under an agreement that is a lease and option to purchase from Merl W. and Margaret Swanson of Mina, Nevada, executed in 1963.

History of Property

Mineralization is reported to have been discovered as early as 1879 at what is now known as the Simon Mine, and a few small shipments of surface and near-surface ore were made. However, no concerted effort to explore and develop the area was made until about 1916.

In 1918, P. A. Simon acquired the property and shortly thereafter organized the Simon Silver-Lead Mines Company. By 1919 the property had been explored to a depth of 500 feet from the No. 1 Shaft. The grade of ore proved too low to ship to smelters and available custom mills, so that in 1921 a loan of $100,000 was obtained from U.S. Smelting Refining and Mining Company for the erection of a 100 ton/day flotation mill which was subsequently enlarged to 250 tons. The mill operated from December, 1921 to June, 1922 when it was shut down pending the sinking of the three-compartment No. 3 Shaft. Milling was resumed for a short time in 1923 and again in 1925.

Because of financial difficulties a new group managed by J. T. Robertson took over from Simon, and considerable development work was done. Milling was resumed in August, 1926 and continued until February, 1927 when it appears the mill was permanently shut down. However, the mine was kept pumped out until December, 1932 when it was allowed to fill, as there seemed no relief forthcoming from the prevailing low metal prices. During this period considerable exploration was done from the No. 3 Shaft on the 800, 900, and 1000 Levels west of the old productive areas by the Bryan Mining Company. Some new ore was found in what were called the 816, 905, 808, and 706 ore bodies which later were the principal objectives of Federal's exploration.

In 1937 the No. 3 Shaft was unwatered to the 800 Level for a short time by S. P. Warren, but was allowed to refill as finances were inadequate. At this time it was found that the 442, 500, 700, and 800 Levels were caved a few feet away from the shaft stations.

Subsequently, in the 1940s and 1950s, there was some production from the 350 Level and above by the B.B.S. Company and others.

All of the foregoing operations except possibly the production of a few thousand tons mined above the water level resulted in a financial loss. Among some of the losses, B. B. Bryan had personally loaned the Bryan Mining Company $420,000, and U. S. Smelting Refining and Mining Company only recovered a part of its loan for the erection of the mill in 1921.

In 1963 Federal unwatered the No. 3 Shaft to a depth of 590 feet, but shaft conditions were so bad that this development approach was abandoned. During the unwatering it was found that there was considerable caving on the 442 and 500 Levels. In December, 1964 the Messerly Shaft was started, and it was completed at a depth of 1,088 feet in August, 1965. Subsequently, new 800 and 1000 Levels (Plate 2) were driven to develop the 816, 905, 808, and 706 ore bodies that had been discovered during the exploration work of the early 1930s. Federal's work to date is about as follows:

Shaft sinking	1,088 feet
Drifting and crosscutting	5,400 "
Raising	800 "
Underground diamond drilling	11,937 "
Surface " "	6,643 "

The foregoing is exclusive of many thousands of feet of long-hole drilling, and much raising and crosscutting from the stopes for exploration and stope fill. At present 21 men are employed at the mine working on two shifts. Current work is mining in two stopes above the 800 Level, and underground diamond drilling and long-holing.

Past Production

Known production and grade of ore prior to Federal's work is as follows:

Date	Tons Milled	Ag	Pb	Zn
Dec., 1921 - July, 1922	21,814	4.1	5.9	7.0
1923	14,000	3.5	5.4	5.8
March, 1925 - May, 1925	8,000	2.7	5.1	5.4
August, 1926 - Feb., 1927	31,011	2.1	4.0	4.8
1945	1,451	2.8	4.7	5.3
1946	?660 SHIPPED	11.4 ~~2.5~~	15.1 ~~3.5~~	11.0 ~~3.1~~
1959	240 SHIPPED			

All of the above production is from east of No. 3 Shaft and principally from around the old No. 1 Shaft. Total production from this area has been estimated by various people as about 90,000 tons.

Federal's production (ore stockpiled at surface) as obtained from the mine office is approximately as follows:

1966 through February, 1968	Tons	Ag	Pb	Cu	Zn
Development ore	3,384	1.66	2.00	0.14	2.13
Medium grade	15,751	4.10	4.65	0.20	4.45
Shipping ore	183	8.46	10.49	0.86	9.98
Ore to Bellevue mill	695	6.40	7.12		6.54
Total through February, 1968	20,113				
March and April, 1968	1,420				
Total through 4/1/68	21,533				

A breakdown by stopes of Federal's production through February, 1968, as far as possible from records at the mine is given below. All of this production is from the new mine area - that is, north and west of No. 3 Shaft (Plate 2).

	Tons	Ag	Pb	Cu	Zn
1010 Stope - Medium grade	3,728	4.27	4.98		4.68
1011 " " "	5,723	3.80	4.20		4.16
1030 " " "	1,978	5.54	5.35	.09	4.90
" " - Development	739	0.55	1.16	.03	1.39
810 " - Medium grade	3,029	3.83	4.77	.07	4.62
" " Development	1,043	1.93	2.51	.02	2.53
812 " - Medium grade	743	5.04	6.86	.44	6.55
" " Shipping grade	183	8.46	10.49	.86	9.98
" " Development	173	2.45	3.28	.25	3.85
813 " - Medium grade	1,049	4.52	4.78	.60	4.21
" " Development	206	2.73	2.62	.97	2.61
Total - Medium and Shipping	16,433	4.26	4.85		4.63
" Development	2,161	1.57	2.12		2.25
Total	18,594				

The 18,594 tons total from the stopes should compare with the 20,113 tons total in the previous tabulation. The discrepancy is mostly due to the fact that the tonnages from development work from the 1010 and 1011 stopes were not available. The shipment to the Bellevue mill is in the 1010 and 1011 stope figures. Stopes 1010, 1011, 1030, and 813 have been abandoned. Stopes 810 and 812 are still being worked. 810 may eventually have the largest production of any stope. On Plate 2 and Section A, Plate 4 it appears that it might be the downward continuation of the 706 ore body developed originally from the No. 3 Shaft, however, an alaskite dike may separate them. Stopes 1011 and 1030 may be the downward continuation of the 808 ore body with apparently a lean zone on the new 800 Level. The 1010, 812, and 813 stopes are on what was known as the 816 ore body. The socalled 905 ore body of only small tonnage has not yet developed into a mineable area.

Geology

The oldest and most important formation in the immediate vicinity of the mineralized area is the Luning limestone. It is overlain by younger rocks all of which are of igneous origin occurring as flows or intrusives (Plate 1).

The Luning formation is a dark, usually massive limestone that is over 6,000 feet thick. It contains practically all of the known economic mineralization. Within the area of the mine there is exposed a thickness of over 1,000 feet which is uniformly homogeneous. The absence of any recognizable horizons makes structural interpretations difficult, particularly underground. On the surface, weathering brings out some bedding features which are helpful in deciphering the structure.

Unconformably overlying the limestone is a quartz keratophyre flow. Surface diamond drilling has shown that this formation is over 300 feet thick. It is the oldest volcanic rock in the area but it does not appear to be of any importance as a host rock for mineralization.

Northwest of the Mammoth Fault (Plate 1) is a series of Tertiary flows that are successively younger to the northwest. They have an aggregate thickness of at least several thousand feet. Within this series are some interbedded volcanic breccias and tuffs.

Intruded into the limestone is an alaskite dike with which mineralization is frequently associated, particularly in the upper part of the old mined area. It is from a few to over 30 feet in thickness and usually dips steeply to the north and west.

The limestone is also intruded by numerous, very irregular grandodiorite porphyry dikes and sills. These intrusives are in general similar but may be of several types and ages. Frequently they are kaolinized. These porphyrys appear to be directly related, as they are similar in composition, to the large granodiorite stock about one-half mile east of the mine workings.

Prominent on the surface by the displacement of the formations are the Mammoth, West, and East Faults. The Mammoth, which is the largest may have a thousand feet or more of movement as it throws the younger volcanic rocks against the limestone. The West Fault, which prominently offsets the alaskite, has several hundred feet of movement. The East Fault probably has around 50 feet. Underground it is evident that there is much additional faulting with displacements up to 50 feet or more. Along both sides of the alaskite dike, particularly on the footwall, there are faults of considerable magnitude which have been termed the Simon fault structure. All of the known larger faults are steep-dipping, from 50 to 90 degrees, with normal displacement, and some have considerable lateral movement.

The limestone in the vicinity of the mine workings dips from 10 to 50 degrees to the southwest although within this regional dip there is some complex minor folding. The volcanic flows generally dip at low angles to the northwest. Both the limestone and the volcanics have been dragged along the faults so that dips here in places parallel the steep dips of the faults.

Mineralization

The mineralization consists of silver, lead, zinc, and copper occurring as galena, sphalerite, and chalcopyrite. Pyrite and arsenopyrite in small amounts accompany these minerals. Gold is usually present only in small amounts - less than .01 ounce per ton.. The relative amounts of the economic metals in the mineralized zones are shown by the production tabulations previously given. The ratios of silver to lead and lead to zinc are fairly constant throughout the mine except that Federal's production has a slightly higher silver to lead ratio than that of the late 1920s. Copper is more abundant in the western part along the Mammoth Fault as indicated by the assays from stopes 812 and 813 contrasted with stopes 810 and 1030. A slightly better grade of ore appears to occur in the Mammoth Fault Area.

Practically all of the mineralization is in the limestone as relatively small, very irregular replacements. Some has been reported in the porphyry, which is possible as the mineralization is post-porphyry. However, this occurrence is commercially of no importance. Both the alaskite and the porphyry frequently contain fine disseminated pyrite.

The greatest concentration of mineralization appears to have been in the old part of the mine, between the East and West Faults, and from the 442 Level to the surface. Most of this occurred along the south or footwall side.

of the alaskite dike (Section C, Plate 4). However, around the 353 Level some mineralization began to occur on the north side. From the old maps much of the ore appears to have been in fracture zones either along the dike or nearby in the limestone. In this area of greatest mineral concentration individual stopes were larger than those found to date and mined by Federal. Federal's stopes 810, 1011, and 1030 are close to the alaskite dike and the Simon structure but do not have the intimate relationship shown by the ore bodies in the old part of the mine. Further west Federal's stopes 1010, 812, and 813 are away from any alaskite and close to and along the Mammoth Fault. Here it is evident that some of the fault movement is post-mineralization as drag ore has been found in the fault. The Mammoth Fault apparently has both pre and post-mineral movement and the pre-mineral movement may be responsible for the mineralization along it.

Most of the ore bodies rake steeply to the north and west (Section A, Plate 4). In the old part of the mine this rake is in part controlled by the steep north-dipping alaskite dike and Simon Fault. Further west it may be in part controlled by bedding which in general is very obscure. In some places the rake is in part controlled by northwest dipping porphyry which the mineralization directly underlies. Since the limestone in the mine area is very homogeneous, evidence of any horizons particularly favorable for mineral deposition has not been observed.

The mineralization does not appear to have been accompanied by any significant alteration of the host rock. Frequently the ore is in sharp contact with fresh-appearing limestone. Occasionally there is some silication of the limestone close to the intrusives, particularly the alaskite. In general the surface rocks show little alteration.

In the old mine oxidation of the ore minerals extended to a depth of about 250 feet. The permanent water table is said to be at about 390 feet. The old mine is reported to have made less than 100 gallons of water per minute. At present the mine is probably making over 100 gallons per minute and most of this is coming from diamond drill holes in the northwestern part of the 1000 Level.

Reserves

Reserves are very difficult to estimate in irregular limestone-replacement mineralization. Even long-producing mines of this type usually can never show more than a year or two of reserves in sight at any one time. Stope 812 is still being mined in a small way and may produce up to a thousand tons more. The only other producing stope is 810, and it has a possibility of continuing up to the 700 Level in which case it might produce a number of thousand tons more of a grade similar to that mined to date. Other than these two areas there are no reserves in sight. Continued work will undoubtedly show additional mineralization, but costs of exploration, development, and mining of the probable small ore bodies would likely exceed their value.

Most of the old reports have called attention to the ore remaining in the old mine. L. B. Spencer's report estimates 30,000 tons remaining in four partly-stoped areas. Very infrequently is it profitable to go back for small blocks of ore in partly-mined areas in long-closed mines where the ground conditions are such as at the Simon. Warren when he reopened the old mine in 1937 found that the levels under water, where most of the estimated ore is said to be, were badly caved as a result of the tendency of the igneous rock to swell. Federal when it opened the old No. 3 Shaft in 1963 found similar conditions. To attempt to mine these uncertain blocks of mineralization in the old mine would take considerable new work as well as rehabilitation of some of the old. In view of what the experience has been to date, it is almost certain it would be an unprofitable venture under any foreseeable metal prices.

Possible Exploration

If further exploration were contemplated surface diamond drilling should be considered. Nearby objectives underground have in general been adequately explored by drilling already done.

Two diamond drill holes under the lowest workings in the old mine are suggested, as this area had the greatest concentration of mineralization. The old mine maps are not fully adequate in showing geologic conditions here, but the alaskite dike which has controlled some of the mineralization may have pinched out. One of these holes should be between the East and West Faults and the other east of the East Fault. The collars of these holes should be to the northeast so as to further explore some of the mineralization found in DDHs 11 and 12. Total footage of these two holes would be about 2,500 feet.

A second objective would be to explore some small surface showings of lead and zinc in the footwall of the Mammoth Fault, about one-half mile northeast of the Messerly Shaft, and probably on the Carbonate claim. This is a virgin area and two 1,000-foot holes along the footwall of the fault about 300 feet apart are suggested.

The foregoing holes are very speculative. Any work in either area should be preceded by detailed surface mapping. The cores from DDHs 8 to 13, inclusive, should be relogged before drilling under the old mine.

A more speculative area which has been suggested by others is the hanging wall of the Mammoth Fault under the volcanic flows. Limestone is present here at not too great a depth as shown by the crosscuts on the 1000 Level. Drag ore in the Mammoth Fault may also be considered encouraging.

Lateral movement along the Mammoth Fault is probably great, and since the holes would be deep, any search would be costly and at present without any definite targets. It, however, is a possibility as the pre-mineral movement along the fault may have influenced and localized mineral deposition. If any such long-range program were considered, it also should be preceded by detailed surface mapping.

Conclusions

The past mining history of the property is not encourgaging. The principal operations, which were in the 1920s were invariably carried on at a loss. Various reasons have been advanced for the unprofitable results such as inexperienced management, poor metallurgy, inadequate finances, and low metal prices. Undoubtedly some of the judgement of the past management was poor, particularly Simon's, as mill and shaft capacities were much greater than afterwards proved necessary. However, succeeding him were some experienced men. There has been improvement in metallurgy since the old mill's operation, but even then the ore was quite amenable to flotation. Finances at times were tight, but some money always seemed available for considerably underground exploration and development work. During the period 1923 to 1929 inclusive, the average price of lead was 7.53¢ per pound and zinc 6.67¢, and silver was 61.5¢ per ounce. Considering labor and material costs at that time, these prices might have been more favorable than those at the present.

Federal's work to date has been disappointing. It has found that most of the old reports were overly optimistic especially regarding available tonnage and failed to portray the extreme irregularity of the mineralization and the probable costly mining conditions. It has found only relatively small irregular ore bodies with high development costs even within the mineralized areas and difficult mining conditions that require filled square-set stopes. A contributing factor to the high mining cost has been insufficient workings places to spread the indirect costs at the mine. Rarely have there been more than two or three working places at any one time.

The over-optimism of L.B. Spencer's old report is apparent when compared with Federal's actual results, exclusive of development ore, to the end of February, 1968.

	Tons	Ag	Pb	Zn	Cu
816 Ore body					
L. B. Spencer	38,700	13.00	9.00	8.00	2.00
Federal stopes 1010, 812, 813	5,703	4.52	5.37	5.01	0.50
808 Ore body					
L. B. Spencer	46,000	5.00	5.00	6.00	
Federal stopes 1011, 1030	7,701	4.24	4.49	4.35	
706 Ore body					
L. B. Spencer	60,000	4.00	3.00	3.50	
Federal stope 810	3,029	3.83	4.77	4.62	

Concerning the foregoing tabulation, stope 812 is still producing in a small way. Stope 810 is active and the ore may continue up to the 700 Level so that it might eventually have a total production of as much as 10,000 tons. The 816 ore body has been very disappointing in both tonnage and grade of ore. In the 706 and 808 ore bodies, the grade has been reasonably close to that estimated in the old reports, but the tonnage greatly deficient.

The failure of the results to date to come up to the expectations generated by the old reports has not been from lack of exploration. Federal's underground work has been thorough. Much diamond drilling along with thousands of feet of long-hole drilling on the levels and in the stopes have fairly well eliminated the possibility of any substantial extensions of the known ore bodies in the area of the 800 and 1000 Levels or any nearby new ones of appreciable size.

The outlook that further exploration might disclose better ore bodies than found to date is not good. The very considerable exploration of the past is discouraging and the absence of any widespread alteration of the country rock, which frequently accompanies strong mineralization, is not encouraging. In view of all the circumstances it would seem logical to bring the operation to a close, as even the mining of what ore is in sight underground is unprofitable.

The disposal of the stockpiled ore that is on the surface is a separate problem that I understand Federal is now studying. It is possible, but not probable, that it might affect a decision regarding the mining of what ore is in sight underground.

If further exploration were contemplated a modest surface drilling program totalling about 4,500 feet is suggested. Such a venture might be of interest to some of the larger companies, particularly oil companies that are diversifying into mining and are able to undertake very speculative enterprises.

Ralph Tuck

June 13, 1968

Ralph Tuck

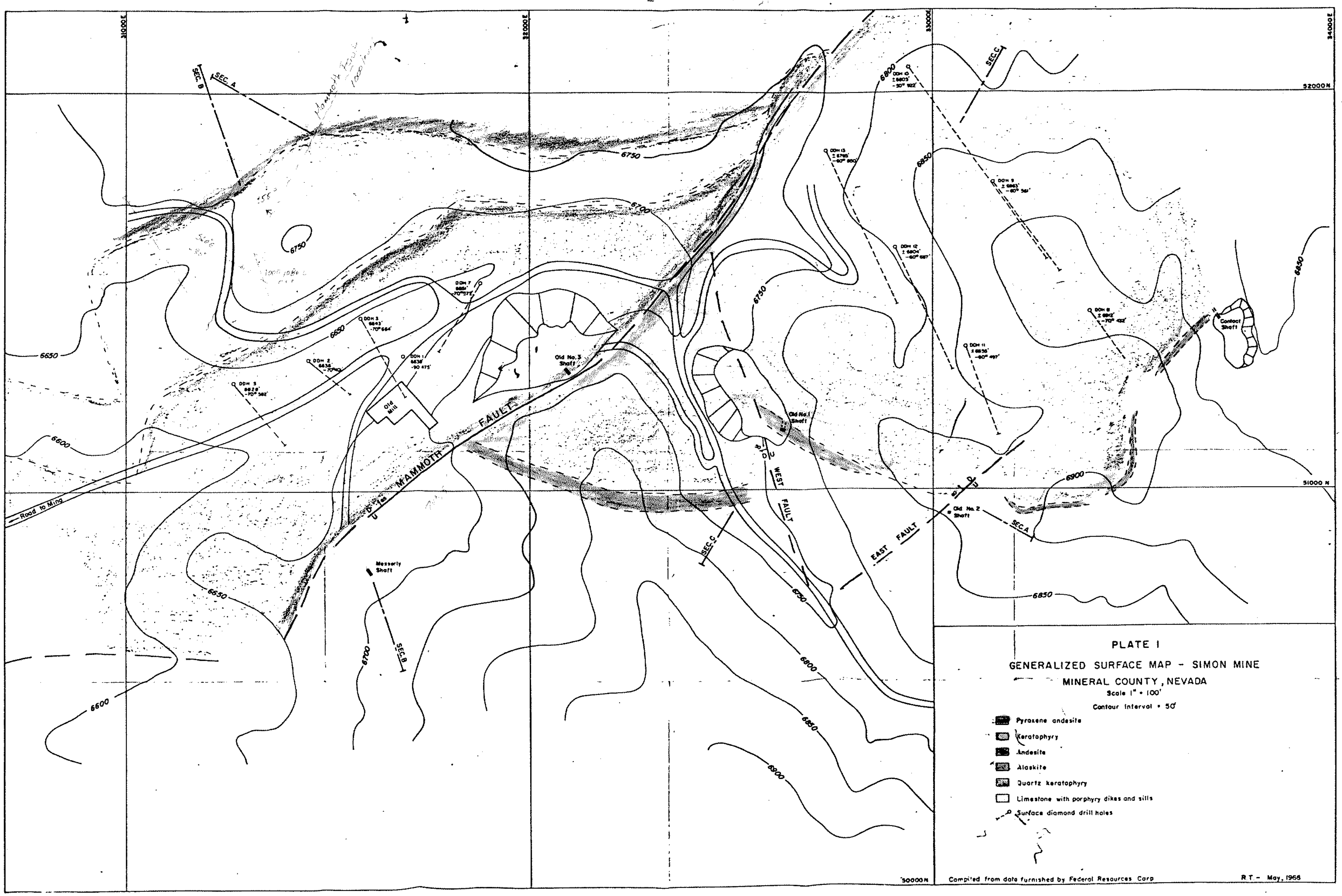
PLATE I
GENERALIZED SURFACE MAP - SIMON MINE
MINERAL COUNTY, NEVADA
Scale 1" = 100'
Contour Interval = 50'
Pyroxene andesite
Keratophyry
Andesite
Alaskite
Quartz keratophyry
Limestone with porphyry dikes and sills
Surface diamond drill holes
Compiled from data furnished by Federal Resources Corp
R.T. - May, 1968
MAMMOTH FAULT
WEST FAULT
EAST FAULT
SEC. A
SEC. B
SEC. C
Old No. 1 Shaft
Old No. 2 Shaft
Old No. 3 Shaft
Contact Shaft
Messerly Shaft
Old Mill
Road to Mina
31000E
32000E
33000E
34000E
52000N
51000N
50000N
6600
6650
6700
6750
6800
6850
6900

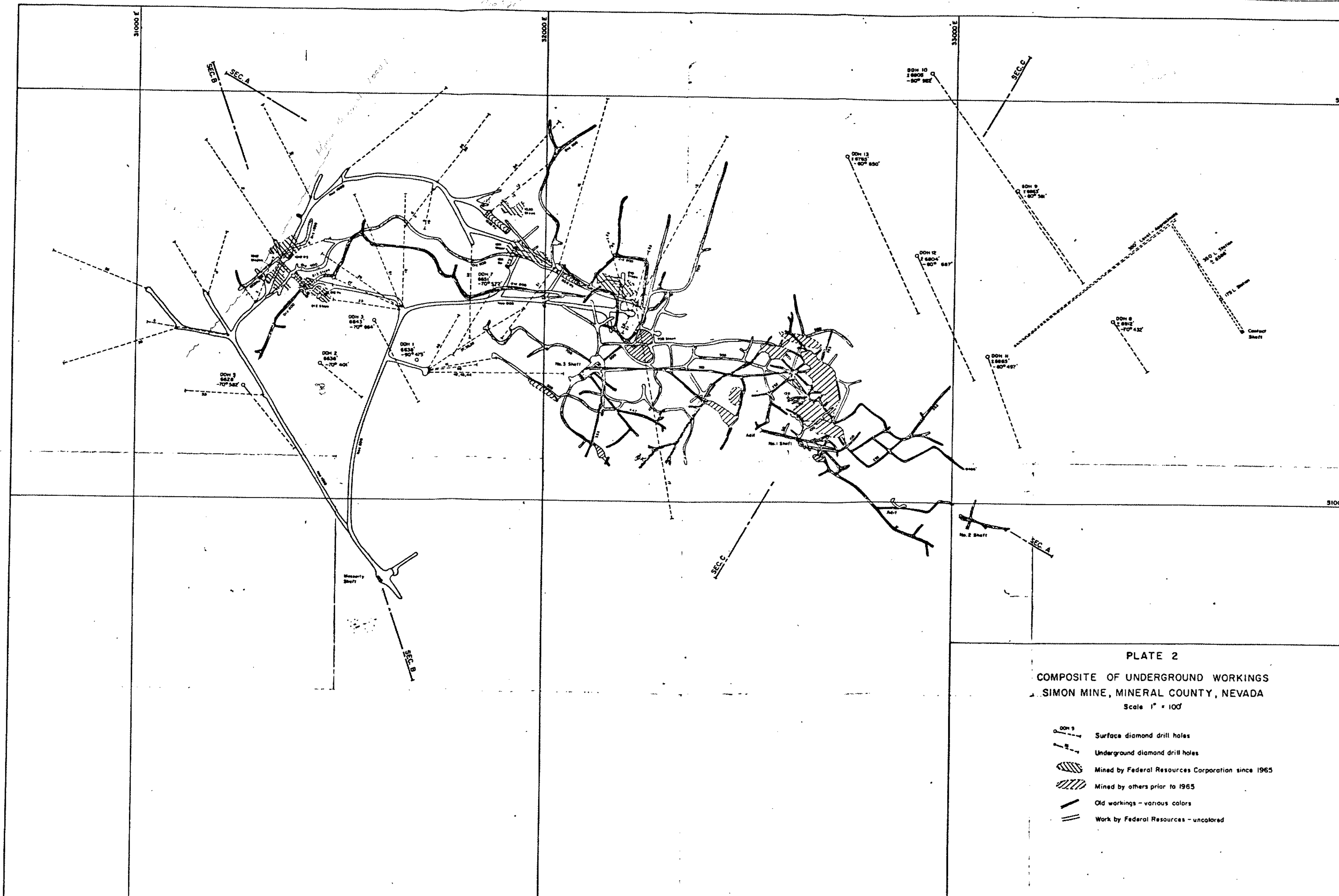

PLATE 2

COMPOSITE OF UNDERGROUND WORKINGS
SIMON MINE, MINERAL COUNTY, NEVADA

Scale 1" = 100'

DDH 9 — Surface diamond drill holes
Underground diamond drill holes
Mined by Federal Resources Corporation since 1965
Mined by others prior to 1965
Old workings – various colors
Work by Federal Resources – uncolored

Compiled from data furnished by Federal Resources Corp

R.T. May, 1968

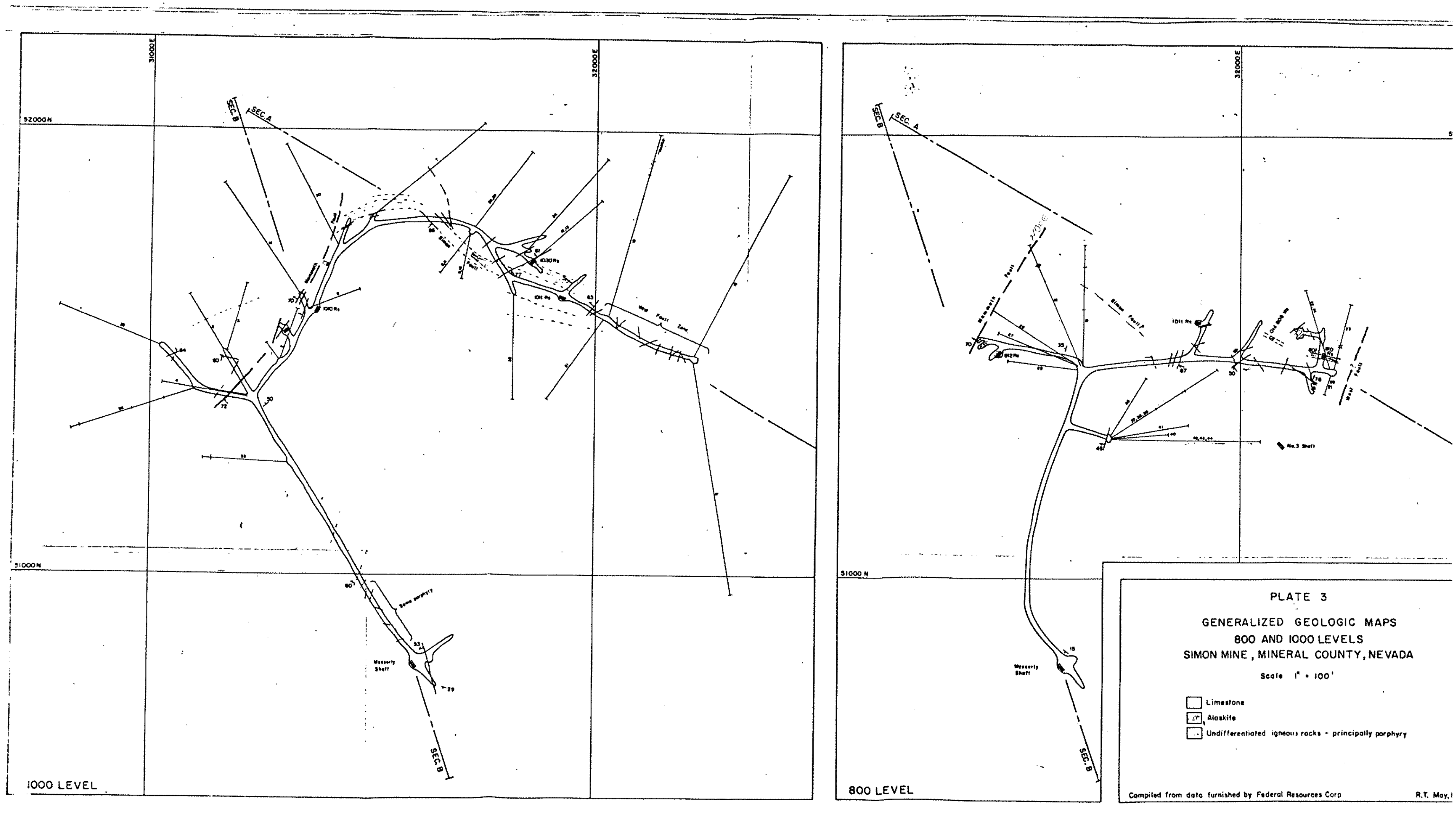

PLATE 3
GENERALIZED GEOLOGIC MAPS
800 AND 1000 LEVELS
SIMON MINE, MINERAL COUNTY, NEVADA
Scale 1" = 100'
Limestone
Alaskite
Undifferentiated igneous rocks - principally porphyry
Compiled from data furnished by Federal Resources Corp
R.T. May, I
1000 LEVEL
800 LEVEL
SEC. A
SEC. B
52000 N
51000 N
31000 E
32000 E
Messerly Shaft
No. 5 Shaft
1010 Rs
1011 Rs
1030 Rs
812 Rs
West Fault Zone
Mammoth Fault
Simon Fault ?
Same porphyry

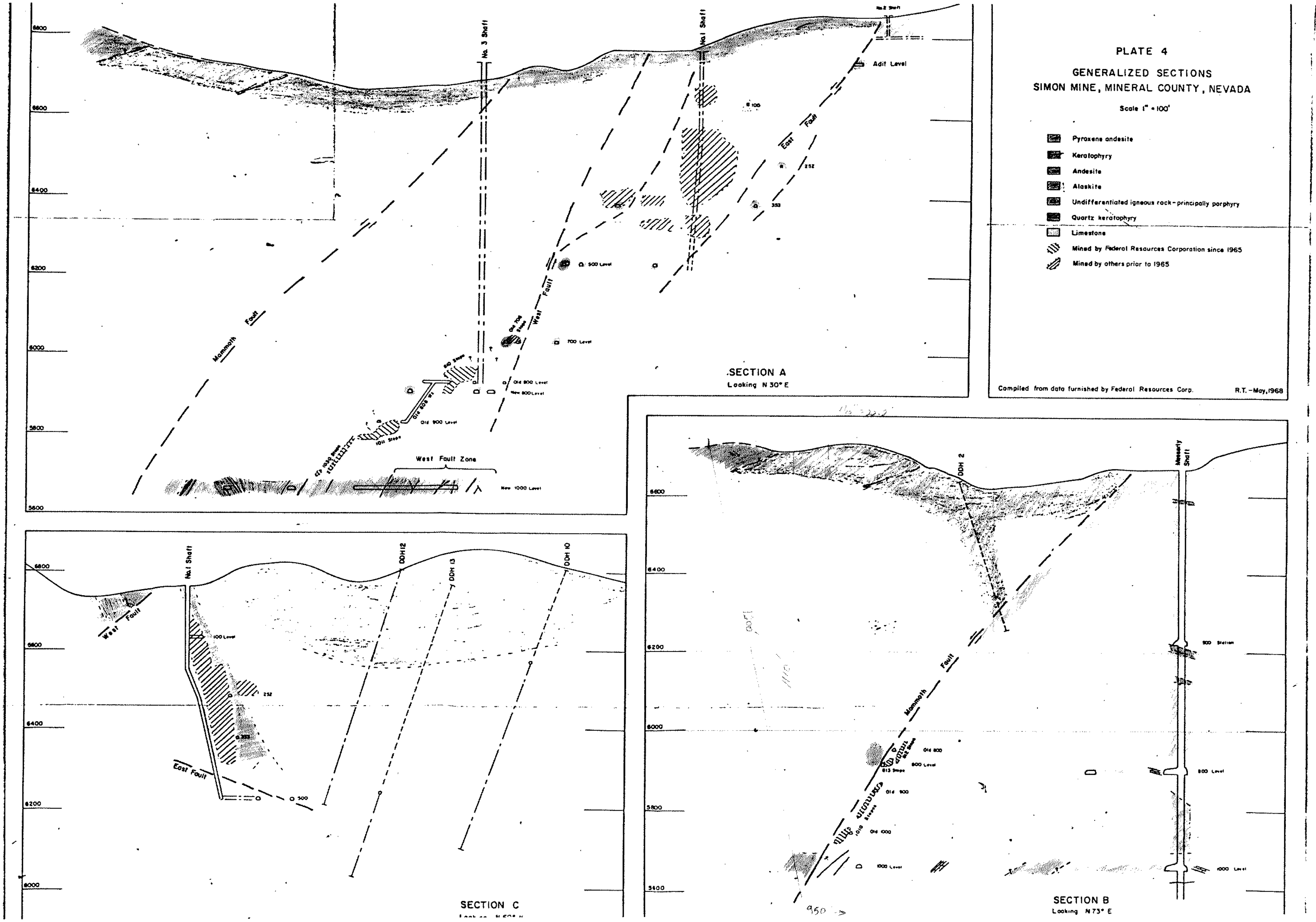
PLATE 4
GENERALIZED SECTIONS
SIMON MINE, MINERAL COUNTY, NEVADA
Scale 1" = 100'
Pyroxene andesite
Keratophyry
Andesite
Alaskite
Undifferentiated igneous rock - principally porphyry
Quartz keratophyry
Limestone
Mined by Federal Resources Corporation since 1965
Mined by others prior to 1965
Compiled from data furnished by Federal Resources Corp.
R.T. - May, 1968
SECTION A
Looking N 30° E
No. 3 Shaft
No.1 Shaft
No.2 Shaft
Adit Level
East Fault
West Fault
Mammoth Fault
West Fault Zone
500 Level
700 Level
Old 800 Level
New 800 Level
Old 900 Level
New 1000 Level
Old 706 Stope
810 Stope
1011 Stope
SECTION B
Looking N 73° E
Messerly Shaft
DDH 2
Mammoth Fault
900 Station
800 Level
1000 Level
Old 800
Old 900
Old 1000
813 Stope
SECTION C
DDH 10
DDH 13
DDH12
No.1 Shaft
100 Level
East Fault
West Fault
6800
6600
6400
6200
6000
5800
5600